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28 June 2011

Ms. Tamara Zeier, P.E.
Project Navigator, Ltd.
One Point Drive, Ste. 320
Brea, California, 92821

Subject: Geotechnical Investigation of the IRM Area
Ascon Landfill Site
Huntington Beach, California

Dear Ms. Zeier:

GENERAL

This letter report documents the results of a geotechnical investigation performed during the course of the Interim Removal Measure (IRM) at the Ascon Landfill Site (Site) in Huntington Beach, California. The extent of the investigation was limited to the area within the footprints of Lagoons 1, 2, and 3. The investigation consisted of a review and interpretation of relevant Site information, drilling, *in-situ* testing, recovery of representative soil samples, and geotechnical laboratory testing of representative soil samples. Detailed background information, including borehole logs, logs of *in-situ* testing, and laboratory testing results, are included in the appendices of this report.

The results of our investigation are presented in the form of interpreted representative soil profiles and tabulated material properties. This information, along with other relevant information from previous investigations at the Site, is intended for future design evaluations at the Site.

PROJECT BACKGROUND

The Site is located at 21641 Magnolia Street in Huntington Beach, California. The approximate location of the Site is shown in Figure 1. An approximate layout of the Site, with approximate property boundary limits and limits of Lagoons 1 through 5 is shown in Figure 2.

The IRM activities focused on removal of tarry wastes from the footprints of Lagoons 1 and 2 to enable this geotechnical program, and the southern portion of Lagoon 3 in order to reduce the load on the berm between Lagoons 2 and 3 and thereby result in greater berm stability and safety between completion of the IRM and implementation of the final remedy at the Site.

Upon completion of tarry material removal in the three lagoons, an access ramp for Lagoons 1 and 2 and a temporary access ramp ('causeway') for Lagoon 3 were constructed and used to allow for drilling rig access. The approximate location of the access ramps (i.e., south end of Lagoon 1-2 and south-central area of Lagoon 3) are shown in Figure 3.

RELEVANT BACKGROUND INFORMATION

There is no relevant background geotechnical information available within the perimeters of the lagoons, as previous access to these areas was impeded by the presence of tarry wastes in Lagoons 1, 2, and 3.

Background hydrogeological information (i.e., contours interpolated between measurements taken at onsite monitoring wells in September 2010) is shown in Figure 3. It should be noted that these elevations were interpreted from groundwater elevations in wells located away from the lagoons and are, therefore, approximate.

Background topographical information (i.e., the approximate topography of the Site at the completion of the IRM) is shown in Figure 3.

GEOTECHNICAL INVESTIGATION

General

The current Site investigation was performed in accordance with the Interim Removal Measure Workplan of 18 May 2010, and it's Addendum for this Geotechnical Investigation of 23 December 2010. The Addendum to the Workplan is reproduced as Appendix A.

Drilling, Sampling, and *In-Situ* Testing

The drilling, *in-situ* testing, and sampling programs were completed in February 2011. Two boreholes were advanced in each of the three lagoons within the IRM area.

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Boreholes within Lagoons 1 and 2 were advanced upon removal of the majority of tarry wastes. As the tarry wastes were not completely removed from the southwestern portion of Lagoon 3, drilling was conducted from a temporary access road that was placed within the tarry wastes prior to partial removal.

Boreholes advanced during this drilling program are labeled B-1 through B-6. The approximate locations of these boreholes are shown in plan view in Figure 3 and further in Cross Sections A-A′ through C-C′ in Figures 4 through 6, respectively. Also indicated in Figures 4 through 6 are the soil sampling intervals, the Standard Penetration Test (SPT) blow counts (un-corrected blow count values), and soil classification in accordance with the Unified Soil Classification System (USCS). The interpreted borehole logs are enclosed in Appendix B. We note that information in Figures 4 through 6 includes soil classification corrections based upon the geotechnical laboratory testing results.

In order to observe groundwater levels near borings B-1 through B-4, hand auger holes were advanced to approximately 5 feet below ground surface (bgs). Each hand auger hole was advanced before the start of drilling near its corresponding borehole and remained open for several hours until completion of the corresponding borehole. Groundwater was observed in hand auger holes near Boreholes B-2 and B-4 (i.e., where hand auger holes penetrated through the fine-grained layer into the underlying relatively permeable silty sand). Hand auger holes near borings B-1 and B-3 did not penetrate through the fine-grained layer and therefore did not encounter groundwater. Groundwater elevations observed in hand auger holes are indicated in Figures 3 through 5. These observed groundwater elevations are within the range of levels previously recorded for Site groundwater monitoring wells.

Geotechnical Laboratory Testing

Geotechnical laboratory testing was performed on representative soil samples recovered from the boreholes. The representative soil samples were recovered either by pushing thin-walled Shelby™ tubes or by driving the SPT or California Modified samplers, as indicated in Figures 4 through 6.

The geotechnical laboratory testing program included soil classification (ASTM D2487), moisture content and density testing (ASTM D2216 & D2937), and saturated hydraulic conductivity testing (ASTM D5084). Modified Proctor compaction testing (ASTM D1557) was also conducted on three representative soil samples. The

results of the geotechnical laboratory testing are enclosed in Appendix C. Interpreted test results are shown in Figures 7 through 11 and are commented upon in the section below.

INTERPRETATION OF SITE CONDITIONS

General

The complete information collected during this geotechnical investigation program is shown in Figures 4 through 12. This includes sampling locations, sample types, SPT blow counts (uncorrected), the interpreted results of groundwater elevation measurements, stratification, and soil classification based upon the results of visual observation during drilling and geotechnical laboratory testing. The information shown in Figures 4 through 6 indicates that soil profiles within the lagoon area are horizontally layered and generally dominated by two distinct layers: (i) a relatively low-hydraulic conductivity fine-grained/cohesive soil layer that gradually transitions into (ii) relatively high hydraulic conductivity, medium dense layer of mostly cohesionless soils.

Fill is present (i.e., was placed) within a limited area of Lagoons 1 and 2 to provide desired grade for surface water control, and as the access road/causeway material in Lagoon 3. Tarry wastes left in place within the footprint of Lagoon 3 and below the causeway are also shown in Figures 4 and 6.

Characterization of Site Soils

The low-hydraulic conductivity fine-grained/cohesive soil layer (fine-grained layer) is composed of silt (MH) and silty clay (CH). This layer gradually transitions into a clayey sand (SC) layer and further into a silty sand (SM) layer. The thickness of the fine-grained layer varies from 0 to 5 ft. Information presented in Figure 7 indicates that this fine-grained material is generally of high plasticity (representative Plasticity Index, PI = 17 % to 32 %). Figure 9 indicates that this fine-grained material is normally consolidated, and therefore highly compressible (representative strain-based Compression Index, C_c = 12 to 15). Consistent with results of consolidation testing, the results of triaxial testing (Figure 10) show that this layer is relatively weak, as characterized by drained friction angle of 22° to 33° and undrained shear strength of approximately 4 psi. Figure 11 shows that saturated hydraulic conductivity of this fine-grained material is relatively low (less than 10^{-5} cm/s at confining stress of 2.5 psi, which corresponds to present *in-situ* conditions, and less than 10^{-6} cm/s at confining

stress of 20 psi, which corresponds to estimated in-situ conditions at the same elevation at the time of Site closure, assuming the construction of a cap and additional backfill to design grades.

The relatively high hydraulic conductivity, medium dense layer (coarse-grained layer) of mostly cohesionless soils is composed of silty sand (SM), well-graded sand (SW), and clayey sand (SC). At depths exceeding approximately 30 ft, inter-bedded, relatively thin (up to 5 ft) layers of silty clay (CL) and silt (ML) were found. In general, the coarse-grained layer is characterized by a relatively high percentage of fines (particles passing standard US sieve No. 200, see Figure 8). The results of in-hole SPT sounding indicate that the density of this layer is typically medium dense (SPT N = 20 to 30 blows per foot) but varies from loose (SPT N = 9 blows per foot) to dense (SPT N = 55 blows per foot).

Fill that was placed within limited areas of Lagoons 1 and 2 and as the causeway material in Lagoon 3 consists of onsite available materials, including silty sand and silty clay. Compaction characteristics of these materials are presented in Appendix C.

Tarry wastes left in place within the footprint of Lagoon 3 and below the causeway were not tested as a part of the activities documented in this report.

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CLOSURE

This Report was prepared by Mr. Alan Witthoeft, E.I.T., and Dr. Neven Matasovic, P.E., G.E., of Geosyntec. The report was peer reviewed by Mr. Ken Fredianelli, also of Geosyntec. Should you have any questions or require additional information regarding this memorandum, please feel free to contact Neven Matasovic at 714-465-1244.

Sincerely,

Alan Witthoeft, E.I.T.
Senior Staff Engineer

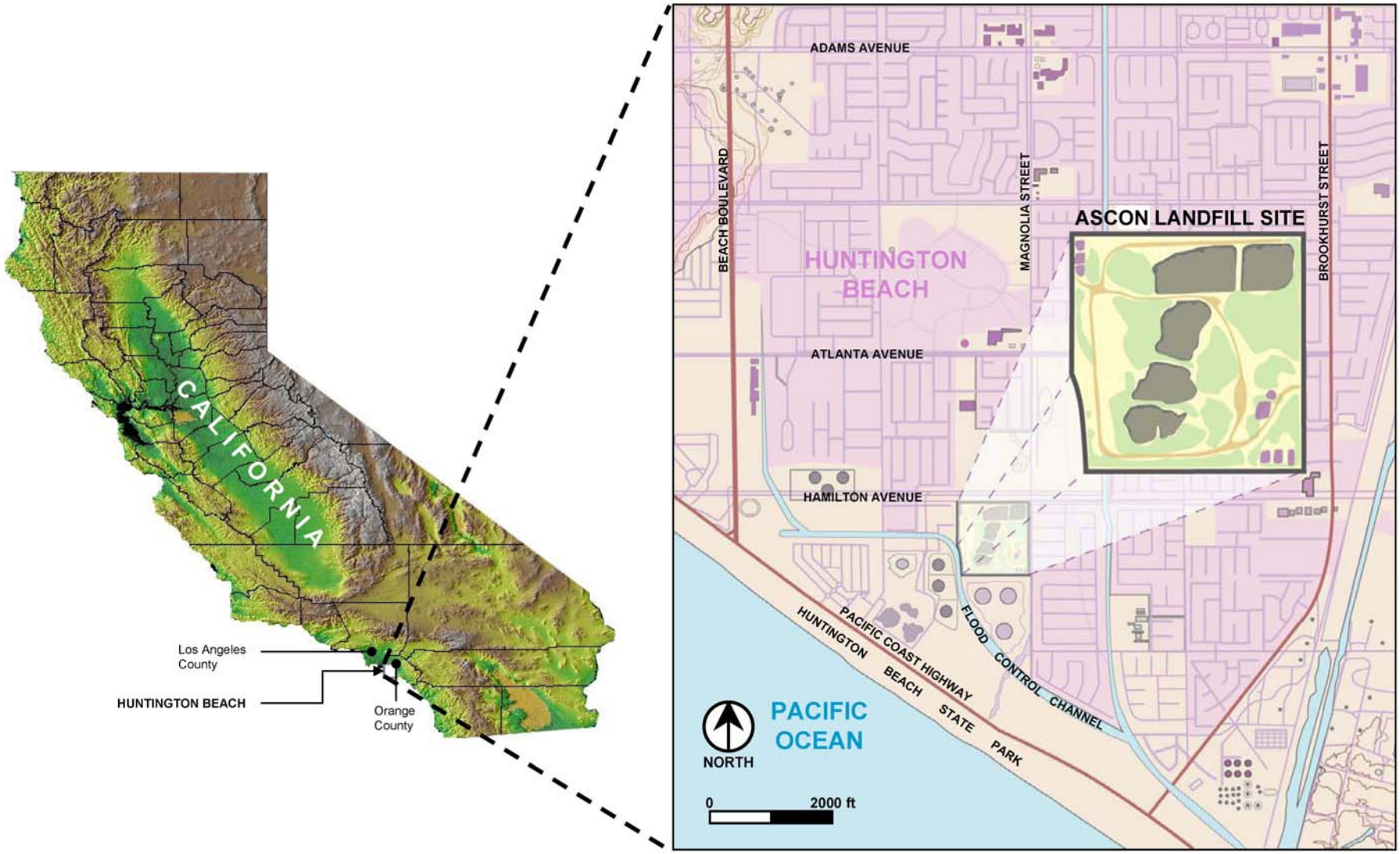
REGISTERED PROFESSIONAL ENGINEER
NEVEN MATASOVIC
GE 2557
GEOTECHNICAL
STATE OF CALIFORNIA

Neven Matasovic, Ph.D., P.E., G.E.
Associate

Attachments:

Figures 1 through 11
Appendices A through C (Listed)

LIST OF APPENDICES



Source: PNL [2005]

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VICINITY MAP
ASCON LANDFILL SITE
HUNTINGTON BEACH, CALIFORNIA

DATE:	APRIL 2011	FILE NO.
PROJECT NO.	HC1243-08	FIGURE 1

Legend

B-1 Approximate Location of Borehole

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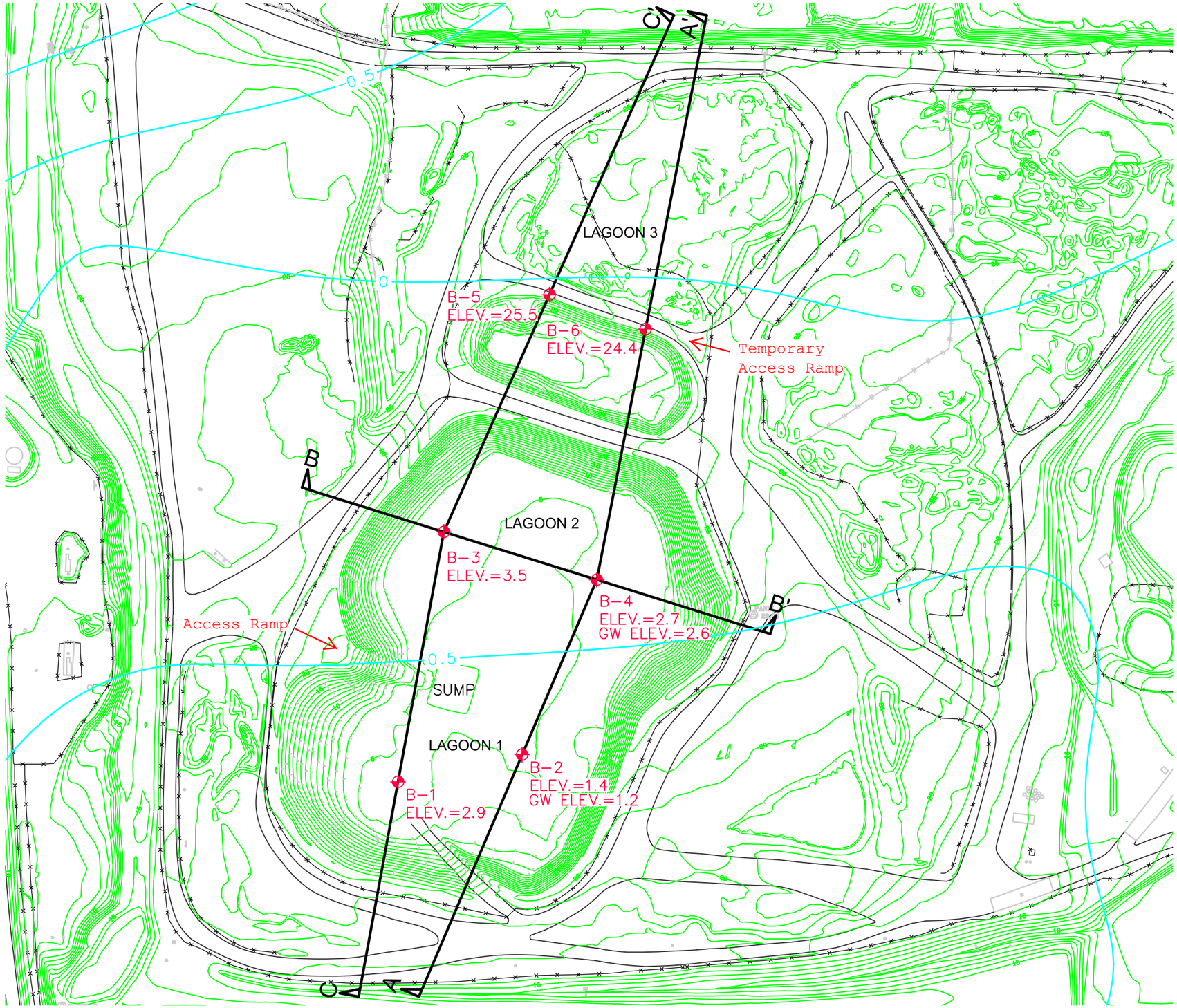
SITE LAYOUT
ASCON LANDFILL SITE
HUNTINGTON BEACH, CALIFORNIA

DATE:	APRIL 2011	FILE NO.	
PROJECT NO.	HC1243-08	FIGURE	2



LEGEND

	PROPERTY LINE
20	ELEVATION CONTOUR BASED ON MARCH 2011 SURVEY
0.5	GROUNDWATER ELEVATION CONTOURS BASED ON MEASUREMENTS BY GEOSYNTEC (SEPTEMBER 2010)
B-1 ELEV.=2.9	APPROXIMATE LOCATION AND ELEVATION AT GROUND SURFACE OF IRM BORING (FEBRUARY 2011)
A A'	APPROXIMATE LOCATION OF SOIL PROFILE
ELEV.	ELEVATION
GW ELEV.	GROUNDWATER ELEVATION OBSERVED IN BOREHOLE

-N-

0 100' 200'

SCALE IN FEET

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BORING AND SOIL PROFILE LOCATIONS
ASCON LANDFILL SITE
HUNTINGTON BEACH, CALIFORNIA

DATE:	MAY 2011	FILE NO.	1243F013
PROJECT NO.	HC1243-08	FIGURE NO.	3

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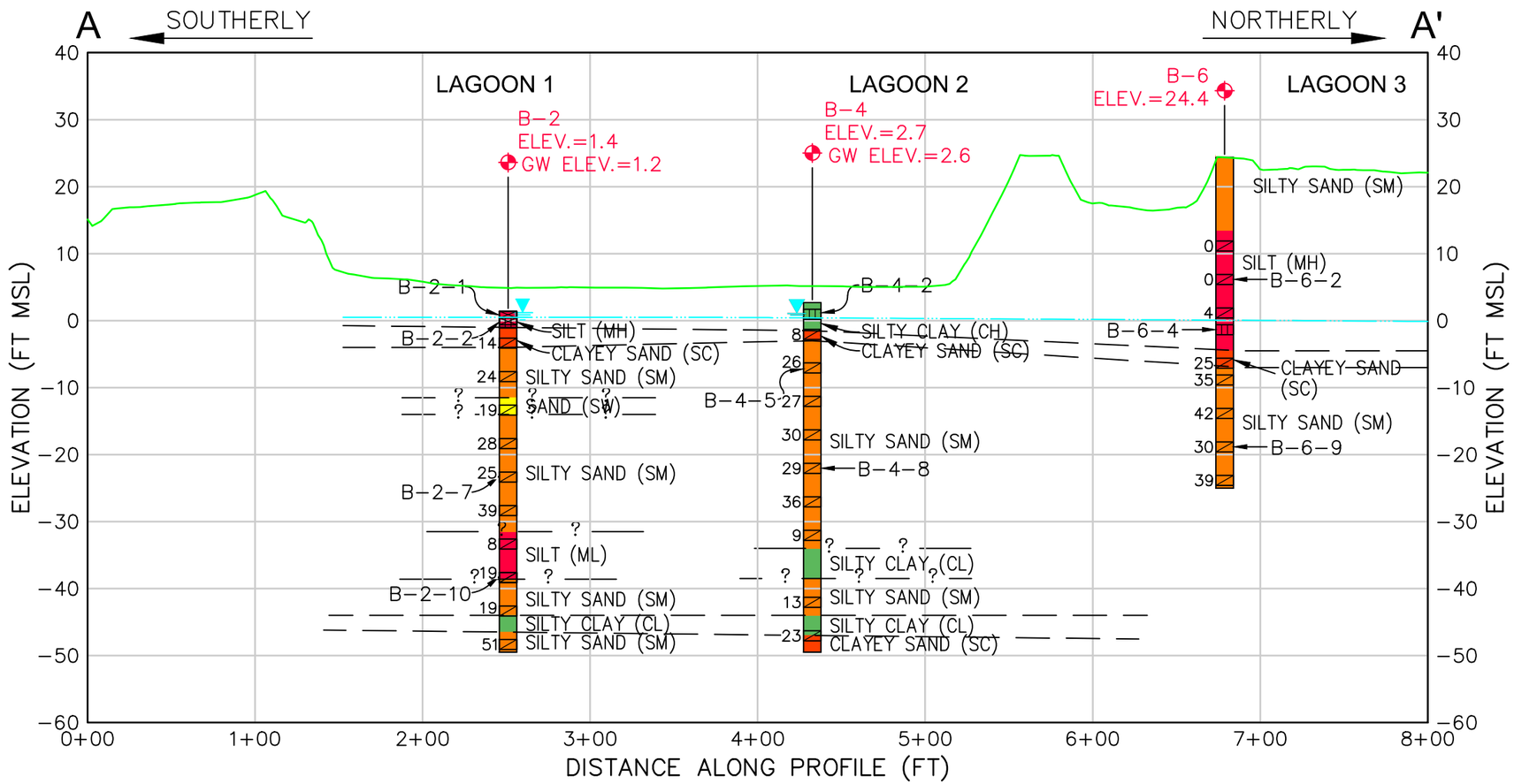
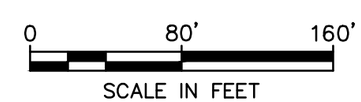


LEGEND

- EXISTING GROUND SURFACE BASED ON MARCH 2011 SURVEY
- GROUNDWATER SURFACE BASED ON MEASUREMENTS BY GEOSYNTEC (SEPTEMBER 2010)
- APPROXIMATE LIMIT OF SOIL STRATUM
- ELEV. — ELEVATION
- GW ELEV. — GROUNDWATER ELEVATION OBSERVED IN BOREHOLE
- MSL — ABOVE MEAN SEA LEVEL
- APPROXIMATE LOCATION OF GROUNDWATER OBSERVED IN BOREHOLE

- SILTY CLAY
- CLAYEY SAND
- SILT
- SILTY SAND
- SAND
- FILL
- WASTE

- B-1-1 — BULK SAMPLE COLLECTED
- B-3-3 — SHELBY TUBE SAMPLE COLLECTED
- 25 B-1-6 — SPT SAMPLE COLLECTED, SPT BLOW COUNT



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SOIL PROFILE A-A'
ASCON LANDFILL SITE
HUNTINGTON BEACH, CALIFORNIA

DATE:	MAY 2011	FILE NO.	1243F013
PROJECT NO.	HC1243-08	FIGURE NO.	4

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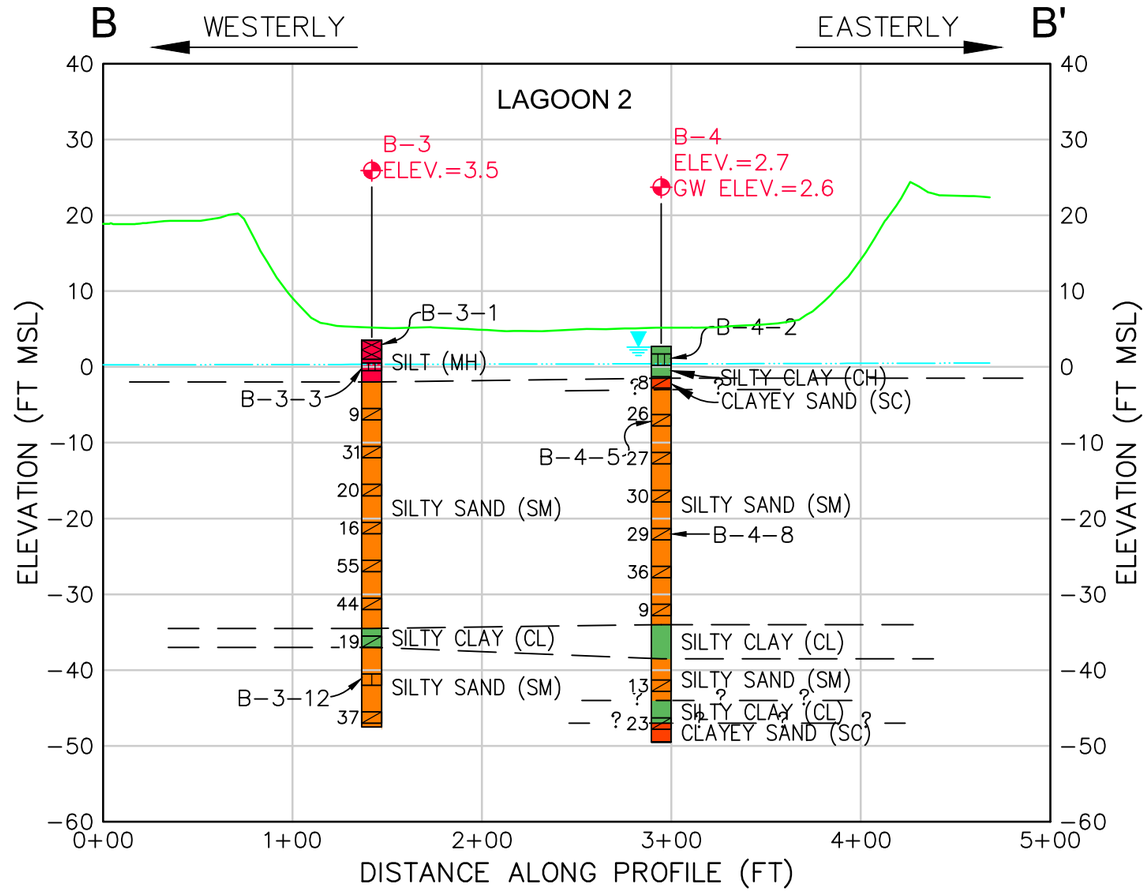
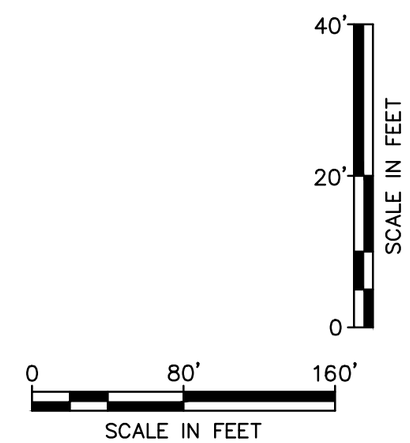


LEGEND

- EXISTING GROUND SURFACE BASED ON MARCH 2011 SURVEY
- GROUNDWATER SURFACE BASED ON MEASUREMENTS BY GEOSYNTEC (SEPTEMBER 2010)
- APPROXIMATE LIMIT OF SOIL STRATUM
- ELEV. — ELEVATION
- GW ELEV. — GROUNDWATER ELEVATION OBSERVED IN BOREHOLE
- MSL — ABOVE MEAN SEA LEVEL
- APPROXIMATE LOCATION OF GROUNDWATER OBSERVED IN BOREHOLE
- SILTY CLAY
- CLAYEY SAND
- SILT
- SILTY SAND
- B-1-1 — BULK SAMPLE COLLECTED
- B-3-3 — SHELBY TUBE SAMPLE COLLECTED
- 25 B-1-6 — SPT SAMPLE COLLECTED, SPT BLOW COUNT
- B-3-12 — CALIFORNIA MODIFIED SAMPLE COLLECTED



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SOIL PROFILE B-B'
ASCON LANDFILL SITE
HUNTINGTON BEACH, CALIFORNIA

DATE:	MAY 2011	FILE NO.	1243F013
PROJECT NO.	HC1243-08	FIGURE NO.	5

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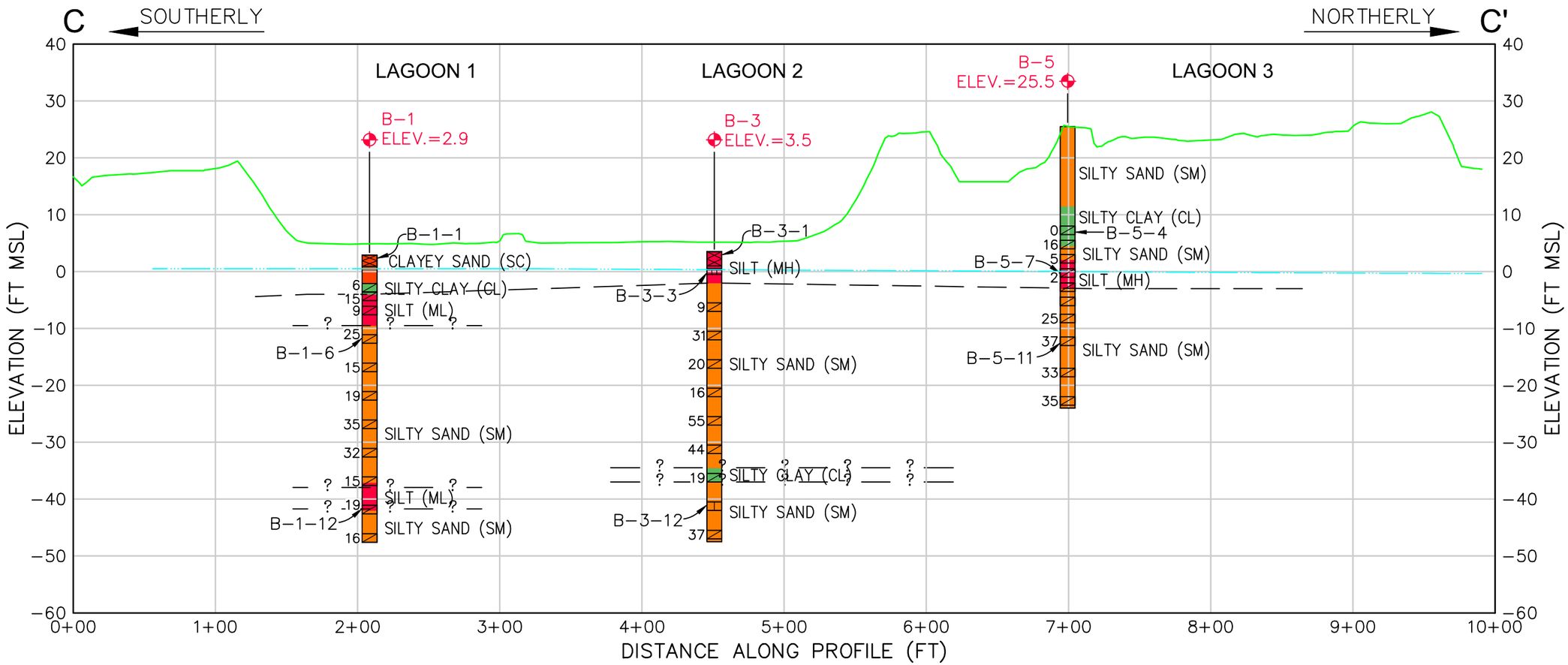
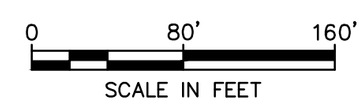


LEGEND

- EXISTING GROUND SURFACE BASED ON MARCH 2011 SURVEY
- GROUNDWATER SURFACE BASED ON MEASUREMENTS BY GEOSYNTEC (SEPTEMBER 2010)
- APPROXIMATE LIMIT OF SOIL STRATUM
- ELEV. — ELEVATION
- GW ELEV. — GROUNDWATER ELEVATION OBSERVED IN BOREHOLE
- MSL — ABOVE MEAN SEA LEVEL
- APPROXIMATE LOCATION OF GROUNDWATER OBSERVED IN BOREHOLE

- SILTY CLAY
- CLAYEY SAND
- SILT
- SILTY SAND
- FILL
- WASTE

- B-1-1 — BULK SAMPLE COLLECTED
- B-3-3 — SHELBY TUBE SAMPLE COLLECTED
- 25 B-1-6 — SPT SAMPLE COLLECTED, SPT BLOW COUNT
- B-3-12 — CALIFORNIA MODIFIED SAMPLE COLLECTED



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SOIL PROFILE C–C'
ASCON LANDFILL SITE
HUNTINGTON BEACH, CALIFORNIA

DATE:	MAY 2011	FILE NO.	1243F013
PROJECT NO.	HC1243–08	FIGURE NO.	6

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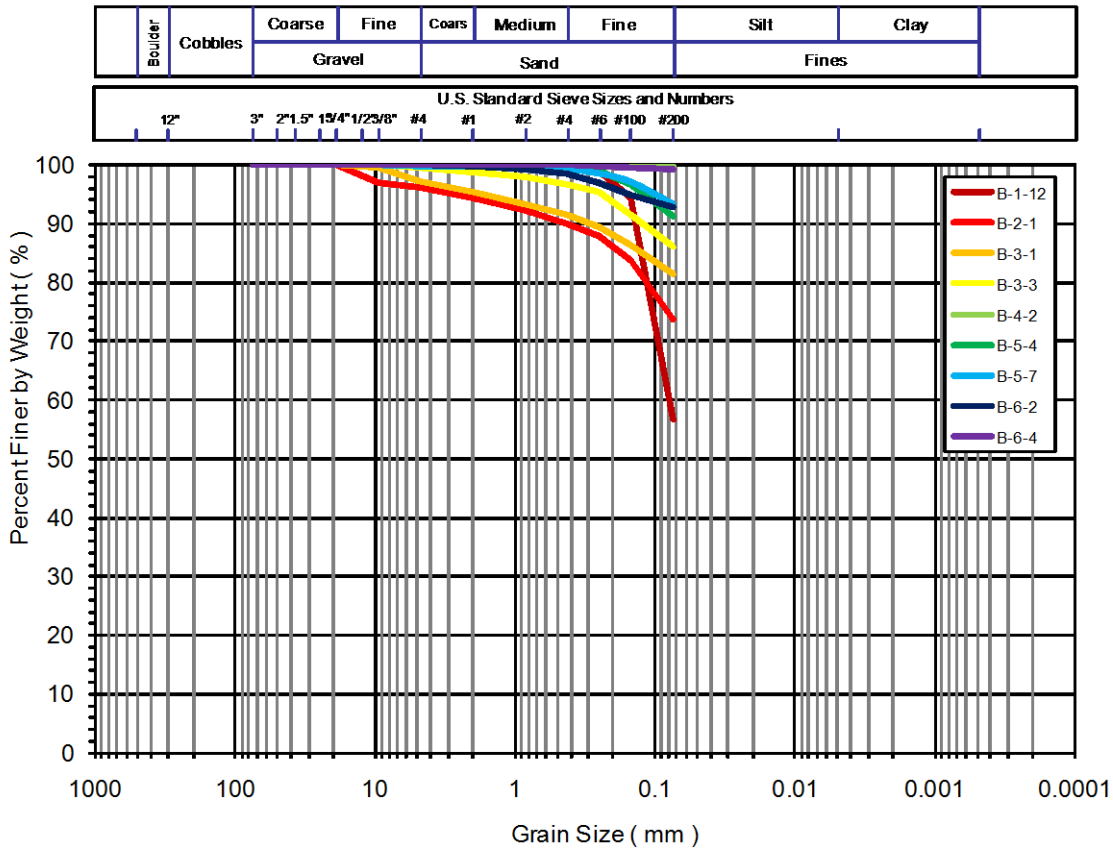
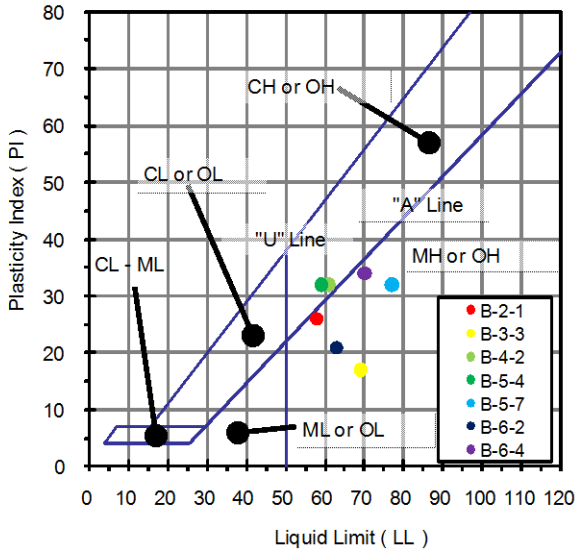
ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits





Sample	Elevation (ft)	% Fines	Soil Type
B-1-12	-42	56.7	ML
B-2-1	1	73.7	MH
B-3-3	0	86.2	MH
B-4-2	1	99.8	CH
B-5-4	7	91.4	CH
B-5-7	0	93.3	MH
B-6-2	6	92.8	MH
B-6-4	-2	99.3	MH

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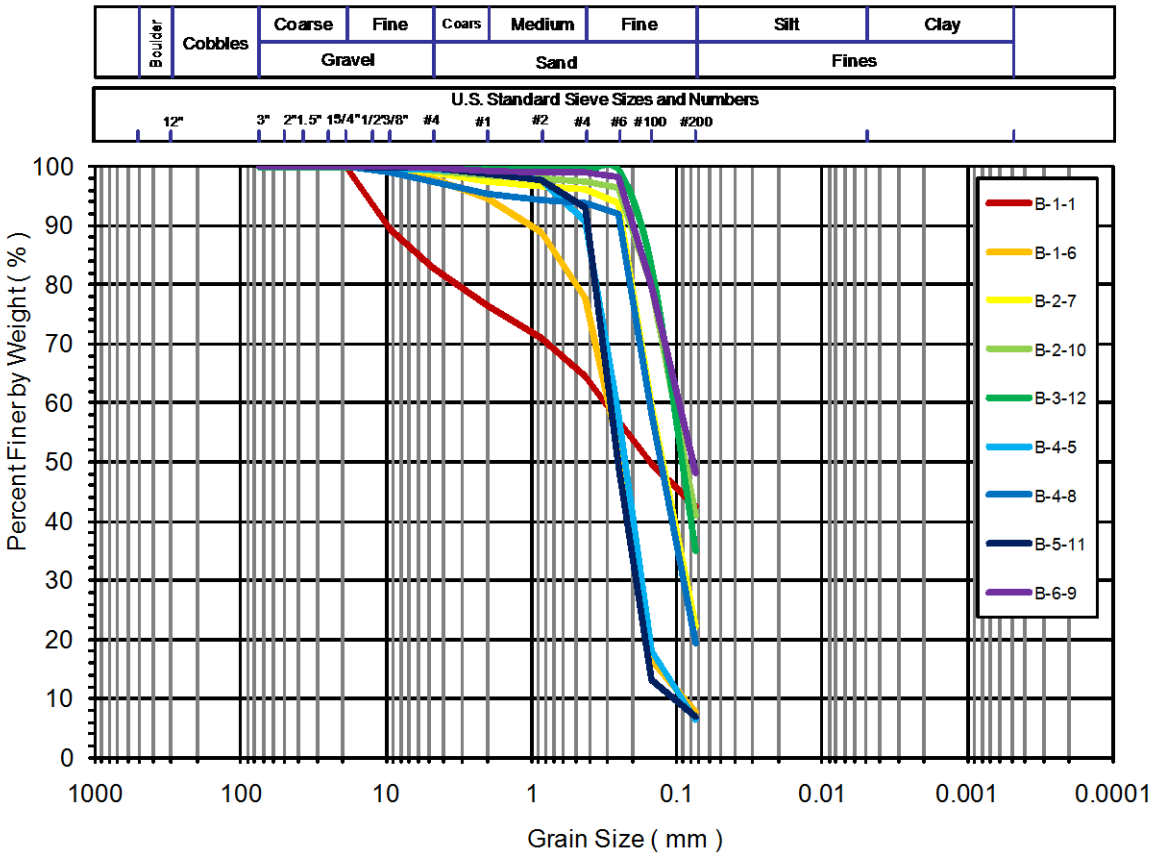
SIEVE ANALYSIS (FINE-GRAINED MATERIALS)
ASCON LANDFILL SITE
HUNTINGTON BEACH, CALIFORNIA

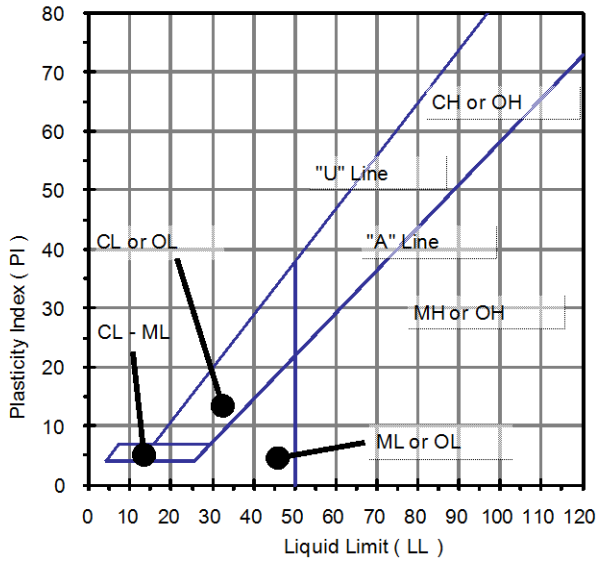
DATE:	MAY 2011	FILE NO.
PROJECT NO.	HC1243-08	FIGURE NO. 7

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Attesberg Limits





Sample	Elevation (ft)	% Fines	Soil Type
B-1-1	2	42.5	SC
B-1-6	-12	7.7	SP-SM
B-2-7	-24	22.3	SM
B-2-10	-39	40.9	SM
B-3-12	-42	34.9	SM
B-4-5	-7	6.4	SP-SM
B-4-8	-22	19.4	SM
B-5-11	-13	7.0	SP-SM

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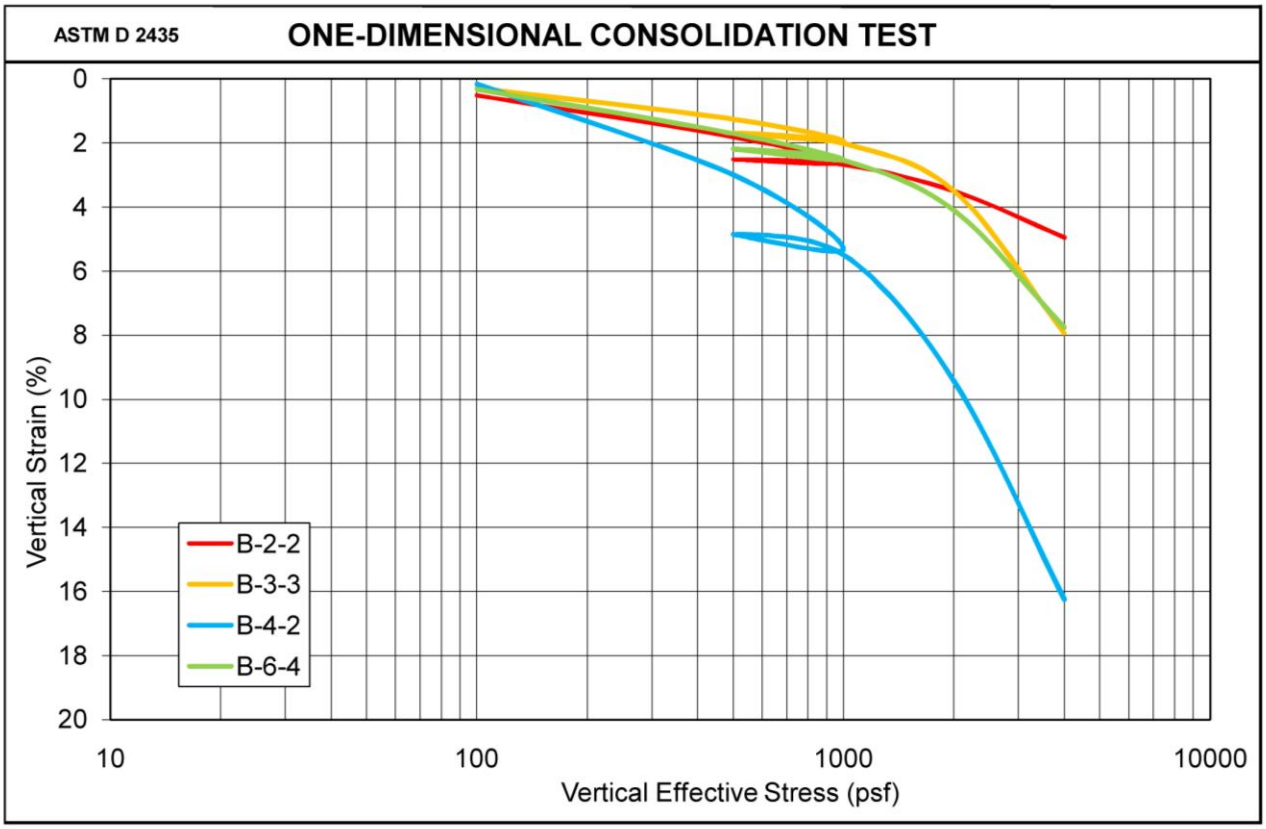
SIEVE ANALYSIS (COARSE-GRAINED MATERIALS)
ASCON LANDFILL SITE
HUNTINGTON BEACH, CALIFORNIA

DATE:	MAY 2011	FILE NO.
PROJECT NO.	HC1243-08	FIGURE NO. 8



Sample	Elevation (ft)	Soil Type	C_C	C_R
B-2-2	-1	MH	4.9	0.6
B-3-3	0	MH	14.8	0.9
B-4-2	1	CH	23.2	1.7
B-6-4	-2	MH	12.1	1.1

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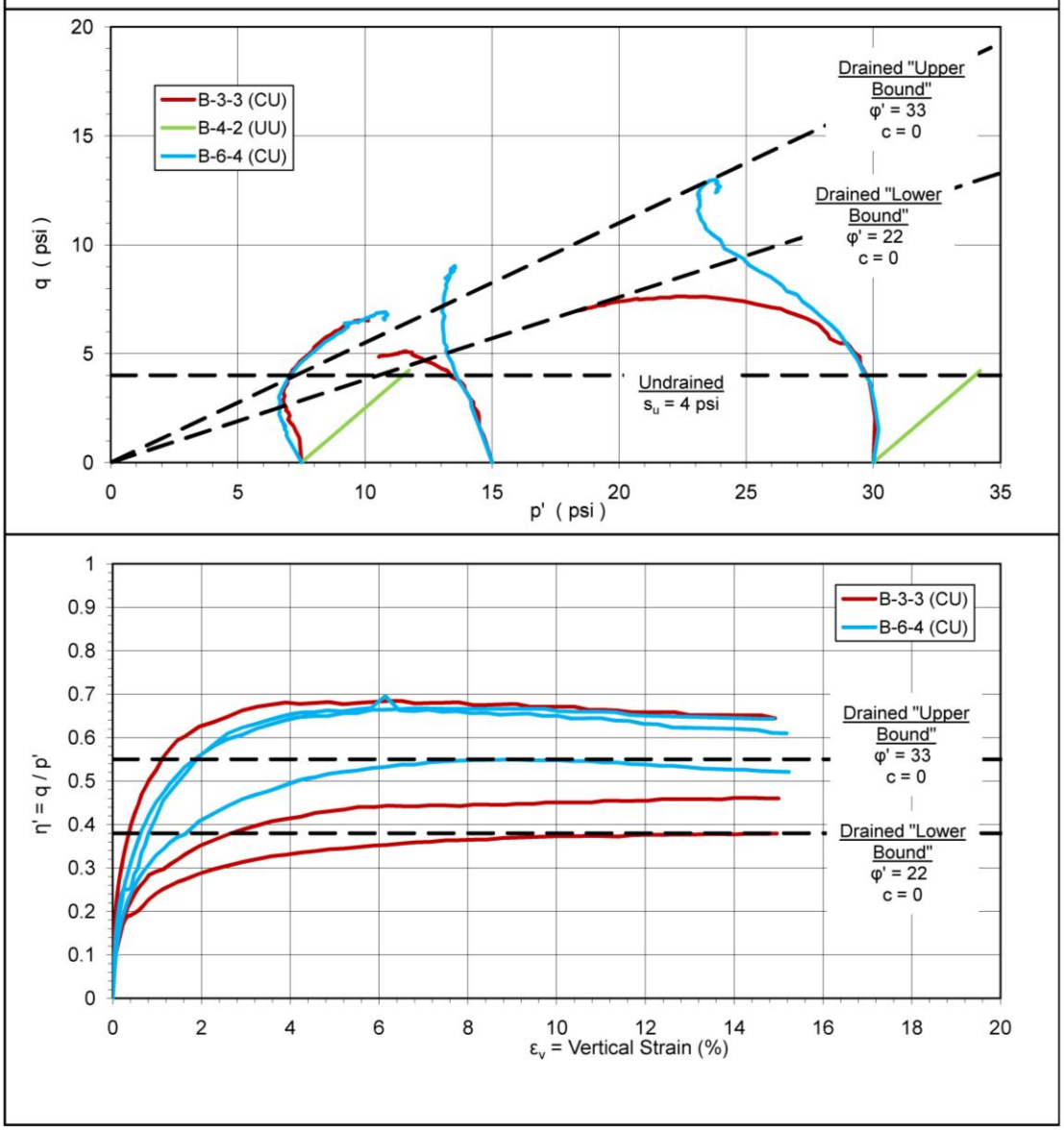
CONSOLIDATION PROPERTIES OF FINE-GRAINED SOILS
ASCON LANDFILL SITE
HUNTINGTON BEACH, CALIFORNIA

DATE:	**APRIL 2011**	**FILE NO.**
PROJECT NO.	**HC1243-08**	**FIGURE NO. 9**

ASTM D 2850
ASTM D 4767

UNCONSOLIDATED-UNDRAINED (UU) TRIAXIAL TEST AND CONSOLIDATED-UNDRAINED (CU) TRIAXIAL TEST



Sample	Elevation (ft)	Soil Type	φ' (°)	s_u (psi)
B-3-3	0	MH	22	-
B-4-2	1	CH	33	-
B-6-4	-2	MH	-	4

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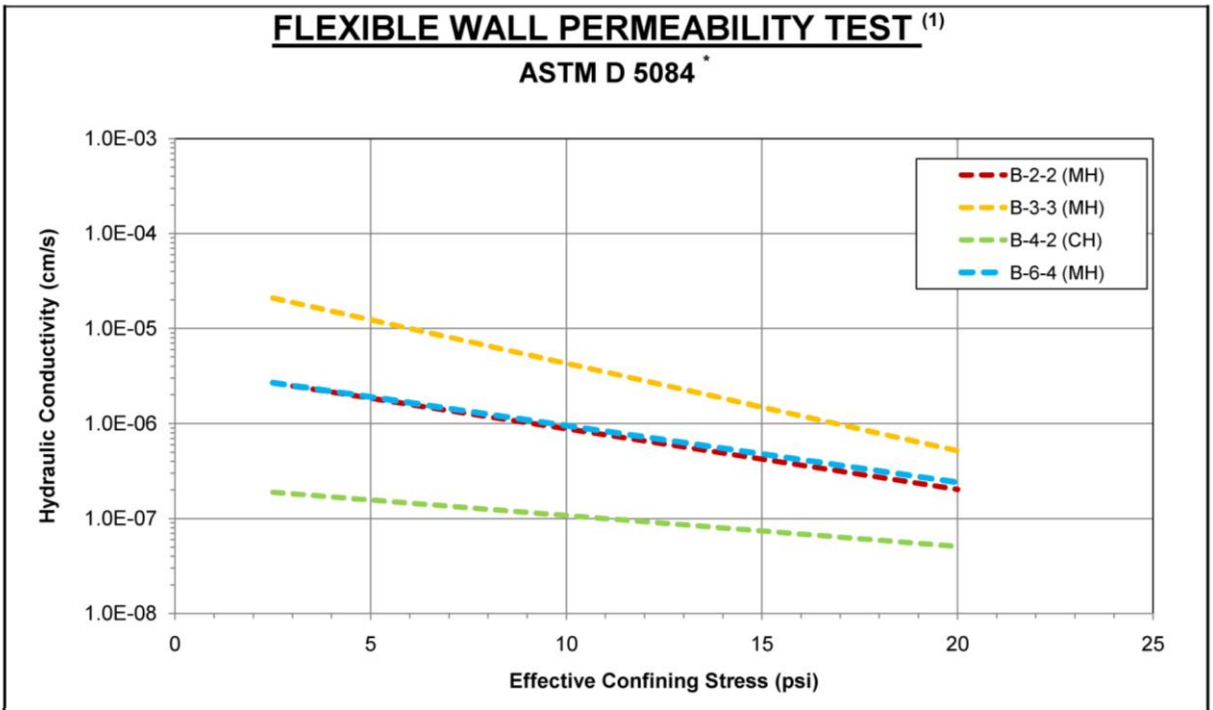
INTERPRETATION OF TRIAXIAL TESTING RESULTS (FINE-GRAINED)
ASCON LANDFILL SITE
HUNTINGTON BEACH, CALIFORNIA

DATE:	**APRIL 2011**	**FILE NO.**
PROJECT NO.	**HC1243-08**	**FIGURE NO. 10**



Notes:

1. Method C, "Falling-Head, Increasing-Tailwater" test procedures were followed during the testing.

* Deviations:

Laboratory temperature at 22±3 °C.

Test specimen final conditions are not presented.

Sample	Elevation (ft)	Soil Type	k at 2.5 psi (cm/s)	k at 20 psi
B-2-2	-1	MH	2.6×10^{-6}	2.0×10^{-7}
B-3-3	0	MH	2.1×10^{-5}	5.2×10^{-7}
B-4-2	1	CH	1.9×10^{-7}	5.1×10^{-8}
B-6-4	-2	MH	2.7×10^{-6}	2.4×10^{-7}

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HYDRAULIC CONDUCTIVITY OF FINE-GRAINED SOILS
ASCON LANDFILL SITE
HUNTINGTON BEACH, CALIFORNIA

DATE:	**APRIL 2011**	**FILE NO.**
PROJECT NO.	**HC1243-08**	**FIGURE NO. 11**

LIST OF APPENDICES

APPENDIX A

IRM Workplan Addendum

PROJECT NAVIGATOR, LTD.

December 23, 2010

Project No. 01-114

Mr. Greg Holmes, Unit Chief
Southern California Clean up Operations Branch – Cypress Office
Attention: Mr. Safouh Sayed, Project Manager
Southern California Cleanup Operations Branch, Cypress
Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, CA 90630-4732

Ascon Landfill Site
Addendum to Interim Removal Measure Workplan

Dear Mr. Sayed:

Enclosed please find two copies of the Addendum to the Interim Removal Measure Workplan for the Ascon Landfill Site located in Huntington Beach, California. We plan to begin the geotechnical sampling/work outlined in this Addendum during the first week in January 2011, contingent on weather and field conditions.

Please feel free to contact me if you have any questions at (714) 863-0017 or tzeier@projectnavigator.com.

Sincerely,

Tamara Zeier

Tamara Zeier, P.E.
Ascon Landfill Site Project Coordinator

TZ:tz

Enclosure: Ascon Landfill Site Interim Removal Measure Workplan Addendum

Cc via email: Greg Holmes, DTSC
Eric Maher, DTSC
Ascon Landfill Site Responsible Parties
Neven Matasovic, Geosyntec Consultants
Ken Fredianelli, Geosyntec Consultants
Mary Urashima, Urashima and Associates

ONE POINTE DRIVE, SUITE 320, BREA, CALIFORNIA 92821
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Interim Removal Measure Workplan Addendum

December 2010

Ascon Landfill Site
Huntington Beach, California

Prepared for

Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, California 90630

Prepared by

Geosyntec Consultants
2100 Main Street, Suite 150
Huntington Beach, California 92648
(714) 969 0800

Project Navigator, Ltd.
One Pointe Drive, Suite 320
Brea, California 92821
(714) 388-1800

Introduction

This Addendum to the Ascon Landfill Site Interim Removal Measure Workplan (Addendum) has been prepared by Geosyntec Consultants (Geosyntec) and Project Navigator, Ltd. (PNL) on behalf of the Ascon Landfill Site Responsible Parties (RPs). The Ascon Landfill Site (Site) is located in Huntington Beach, California, with the street address 21641 Magnolia Street. The purpose of this Addendum is to outline the proposed geotechnical investigation conceptually described in the DTSC-approved Interim Removal Measure Workplan (Workplan). In addition, the Addendum describes certain changes from the approved Workplan. These changes were made in consideration of: (i) expanded scope of work, namely, excavation in Lagoon 3; (ii) observed conditions in the field; and (iii) minimizing the possibility of contaminating the groundwater below the Site resulting from the drilling method proposed in the approved Workplan. For convenience, relevant information from the Workplan is reproduced here.

Proposed Scope of Geotechnical Investigation

The proposed geotechnical investigation will commence after preparation of firm working surfaces (i.e., level surfaces able to bear the weight of a drill rig) in Lagoons 1, 2, and 3. The material underlying the former lagoon material will be cored and sampled via mud rotary drilling techniques. Mud rotary drilling is proposed here (instead of hollow-stem auger drilling, as proposed in the Workplan) because mud rotary is more likely than hollow-stem auger to: (i) prevent potentially impacted perched groundwater from flowing downward through the borehole and (ii) allow for effective grouting of the borehole upon completion of drilling.

A mud rotary drill rig will be used to drill one borehole in Lagoon 1, one borehole in Lagoon 2, and one borehole in Lagoon 3, for a total of three boreholes. Additional boreholes (e.g., additional borehole per lagoon) may be drilled if the RPs decide this would help meet the project objectives or if field conditions warrant additional data (e.g., due to significant visual differences in the subsurface material). DTSC will be informed of any additional borings. The approximate locations of the proposed boreholes are indicated in Figure 1. Field conditions may warrant the relocation of the boreholes. DTSC will be notified of the actual drilling locations and number of boreholes after confirmed in the field. It is noted that the Workplan proposes only two boreholes (one in Lagoon 1 and one in Lagoon 2). The increase in number of boreholes is proposed in light of the expanded scope of work, which was not anticipated by the Workplan, and the desire to gather additional geotechnical information that will be useful in preliminary remedy planning and design.

The boreholes will have an approximate diameter of 3.75 in. and will be advanced to a depth of approximately 50 ft below existing ground surface (i.e., existing after excavation of lagoon

material during the IRM). Samples of the clayey material near the bottoms of the lagoons will be collected using a California modified sampler and a Shelby™ tube sampler. Samples of the material underlying the clayey material will be collected using a standard penetration test (SPT) sampler. After completion of drilling and sampling, each borehole will be back-filled with cement-bentonite grout tremied into place from total depth to surface and will be capped with concrete.

Selected samples are planned to be tested for the following geotechnical properties:

- Grain size distribution by ASTM D-422;
- Atterberg Limits (Plasticity Index, Liquid Limit) by ASTM D-4318;
- Compaction characteristics by ASTM D-1557;
- Moisture content and unit weight by ASTM D-2216, D-2937, and D-4643;
- Consolidation by ASTM D-2435;
- Hydraulic conductivity by ASTM D-5084; and
- Consolidated Undrained Shear by ASTM D-4767.

Changes to the proposed testing regimen from that proposed in the Workplan are outlined in Table 1 below. The results of the testing program proposed here will be used to provide geotechnical input for the design of the interim configuration of the Lagoon bottoms. The Workplan does not address the issue of design of interim configuration. DTSC will be notified of potential changes to the testing regimen.

As stated above, the proposed scope of the geotechnical investigation as outlined in this Addendum differs from that described in the Workplan. Table 1 below compares material elements of the geotechnical investigation methods between the Workplan and this Addendum.

Table 1: Comparison of material elements of proposed geotechnical investigation between Workplan and Addendum

	Workplan	**Addendum**
Number of Boreholes	2	3
Drilling Technique	Hollow-stem auger	Mud rotary
Geotechnical Tests to be Performed	• Grain size distribution • Atterberg limits • Moisture content and unit weight • Specific Gravity • Consolidation • Consolidated Undrained	• Grain size distribution • Atterberg limits • Compaction characteristics • Moisture content and unit weight • Consolidation

	Workplan	Addendum
	Shear	• Hydraulic conductivity • Consolidated Undrained Shear

Deliverables

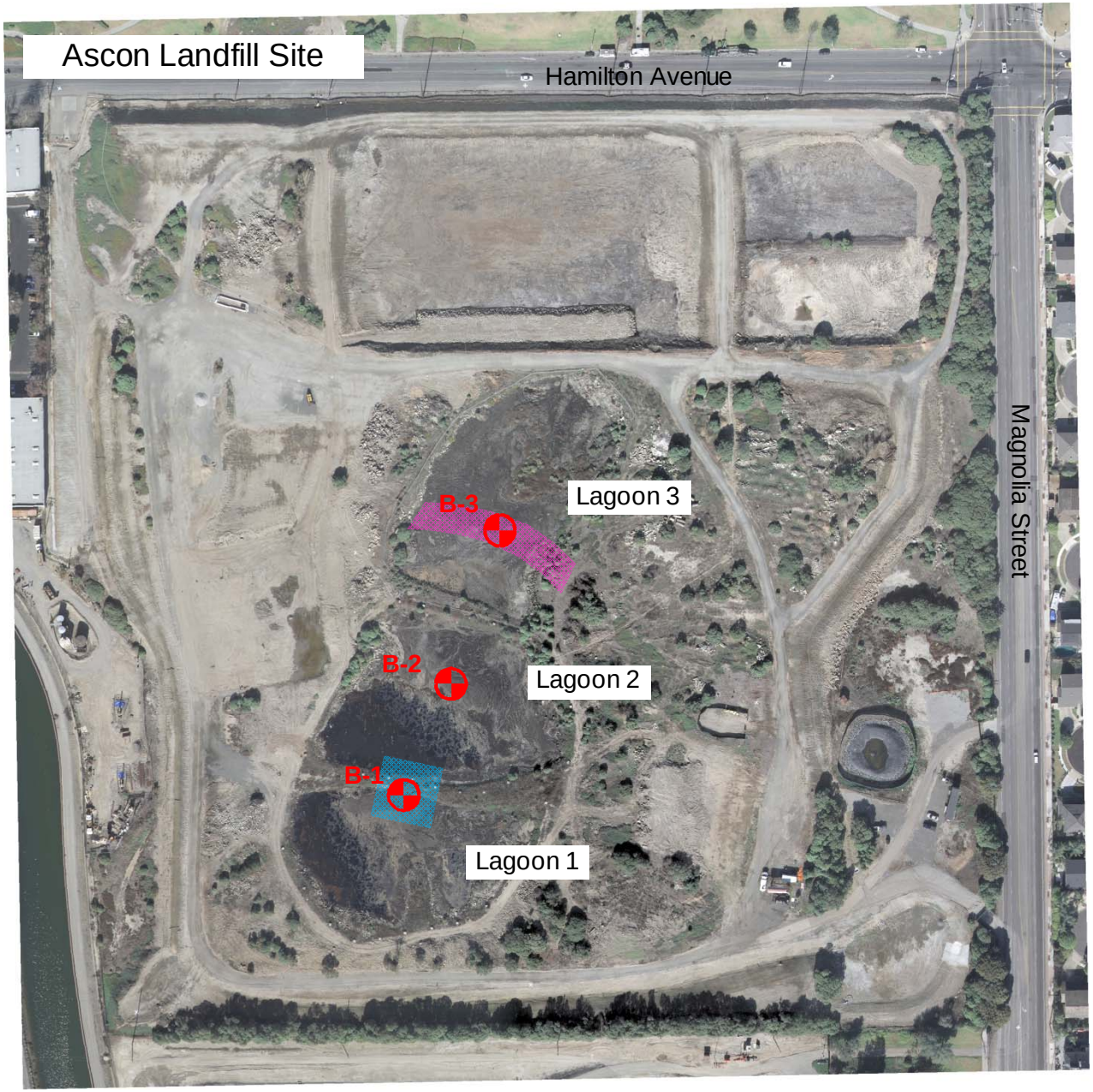
A summary letter report will be prepared and submitted to DTSC describing the findings from the work outlined in this Addendum and geotechnical recommendations. This report will be prepared under supervision of and signed by a California-Registered Geotechnical Engineer.

Health and Safety

The RPs and their contractors understand the hazards associated with working on the Site and with performing geotechnical drilling. The contractors performing the work will both implement task-specific measures and adhere to applicable Site-specific and applicable company-wide health and safety policies. Task-specific measures will include:

- Preparation of a Job Safety Analysis (JSA), outlining potential hazards and corresponding mitigation strategies;
- Convening of a daily tailgate safety meeting informing Site personnel of relevant health and safety issues, response measures, etc.;
- Real-time air monitoring in the breathing zone using a 4-gas meter; and
- Access to mitigation measures (e.g., respirators, etc.).

Site-specific health and safety measures are outlined in the Interim Removal Measure Health and Safety Plan attached to the DTSC-approved Workplan as Appendix B.



NORTH

Legend

- Proposed borehole (approximate location)
- Lagoon 3 access ramp/roadway (approximate location)
- Proposed sump (approximate location)

Not to Scale

Interim Removal Measure Proposed Borehole Locations			**Figure 1**
Addendum to Interim Removal Measure Workplan Ascon Landfill Site, Huntington Beach, California	December 2010	Project Navigator, Ltd.	Geosyntec consultants

APPENDIX B

Geotechnical Borehole Logs

Geosyntec consultants
2100 Main St
Suite 150
Huntington Beach, CA 92648
Tel: (714) 969-0800
Fax: (714) 969-0820

GS FORM: GEOTECH2 01/04

BOREHOLE LOG

BORING B-1 **SHEET** 1 **OF** 2
START DRILL DATE Jan 31, 11
FINISH DRILL DATE Jan 31, 11
LOCATION Huntington Beach, CA
PROJECT Ascon IRM
NUMBER HC1243-08

ELEVATION DATA:
GROUND SURF. (Ft) 2.9
TOP OF CASING (Ft)
DATUM MSL

DEPTH (ft-bgs) | ELEVATION (ft) | DESCRIPTION (1) Soil Name (USCS) (2) Color (3) Moisture (4) Grain Size (5) Percentage (6) Plasticity (7) Density/Consistency (8) Other (Mineral Content, Discoloration, Odor, etc.) | GRAPHIC LOG | SAMPLE: SAMPLE NO. | TYPE | BLOWS PER 6" | N VALUE | RECOVERY (%) | PID READING (ppm) | TIME (00:00) | COMMENTS (1) Rig Behavior (2) Air Monitoring (3) Pocket Pen (4) Tor Vane | LABORATORY RESULTS: DRY DENSITY (pcf) | MAX. DRY DENSITY (pcf) | PERCENT FINES (%) | PERCENT GRAVEL (%) | MOIST. CONTENT (%) | OPT. MOIST. CONTENT (%) | ATTERBERG LIMITS: LIQUID LIMIT | PLASTIC LIMIT | PLASTICITY INDEX

Depth (ft-bgs)	Elevation (ft)	Description	Sample No.	Blows per 6"	N value	Comments	Max. dry density (pcf)	Percent fines (%)	Moist. content (%)	Opt. moist. content (%)
	2	CLAYEY SAND (SC) Gray, moist, fine to medium sand, trace gravel, (17, 41, 42), low plasticity	B-1-1				127.1	42.5	13.0	9.3
	1									
	0	SANDY CLAY (CL) Dark gray, moist, fine to medium sand, trace gravel, (0-5, 20, 75-80), low plasticity								
	-1		B-1-2			Brick fragment at 3 ft bgs Coarser sand at 3.5 ft bgs Brick fragment at 4 ft bgs				
5	-2		B-1-3							
	-3	SANDY CLAY (CL) Brown, moist, (0, 30, 70), low plasticity		3 4 2	6					
	-4		B-1-4	5 7 8	15					
	-5	SANDY SILT (ML) Dark gray, moist to saturated, fine sand, (0, 20, 80), shell fragments								
	-6									
	-7		B-1-5	5 4 5	9					
10	-8									
	-9									
	-10	POORLY-GRADED SILTY SAND (SM) Gray, saturated, fine to medium sand, (0, 70, 30), shell fragments								
	-11		B-1-6	7 10 15	25			7.7	20.3	
15	-12									
	-13									
	-14									
	-15	POORLY-GRADED SILTY SAND (SM) Gray, saturated, fine sand, (0, 50, 50), shell fragments								
	-16									
	-17		B-1-7	3 5 10	15					
20	-18									
	-19									
	-20									
	-21									
	-22		B-1-8	6 8 11	19					
25	-23									
	-24									
	-25									
	-26									
	-27		B-1-9	10 14	35					
30										

CONTRACTOR Gregg Drilling
EQUIPMENT Fraste MD/XL
DRILL MTHD Mud Rotary
DIAMETER 3.75 in. OD
LOGGER Alan Witthoeft
REVIEWER Neven Matasovic
NORTHING
EASTING
COORDINATE SYSTEM:

NOTES: West side of Lagoon 1. 140 lb automatic hammer with a drop height of 30 in. was used. Groundwater was not observed.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

Geosyntec consultants
2100 Main St
Suite 150
Huntington Beach, CA 92648
Tel: (714) 969-0800
Fax: (714) 969-0820

GS FORM: GEOTECH2 01/04

BOREHOLE LOG

BORING B-1 **SHEET** 2 **OF** 2
START DRILL DATE Jan 31, 11
FINISH DRILL DATE Jan 31, 11
LOCATION Huntington Beach, CA
PROJECT Ascon IRM
NUMBER HC1243-08

ELEVATION DATA:
GROUND SURF. (Ft) 2.9
TOP OF CASING (Ft)
DATUM MSL

DEPTH (ft-bgs) | ELEVATION (ft) | DESCRIPTION (1) Soil Name (USCS) (2) Color (3) Moisture (4) Grain Size (5) Percentage (6) Plasticity (7) Density/Consistency (8) Other (Mineral Content, Discoloration, Odor, etc.) | GRAPHIC LOG | SAMPLE: SAMPLE NO. | TYPE | BLOWS PER 6" | N VALUE | RECOVERY (%) | PID READING (ppm) | TIME (00:00) | COMMENTS (1) Rig Behavior (2) Air Monitoring (3) Pocket Pen (4) Tor Vane | LABORATORY RESULTS: DRY DENSITY (pcf) | MAX. DRY DENSITY (pcf) | PERCENT FINES (%) | PERCENT GRAVEL (%) | MOIST. CONTENT (%) | OPT. MOIST. CONTENT (%) | ATTERBERG LIMITS: LIQUID LIMIT | PLASTIC LIMIT | PLASTICITY INDEX

Depth (ft-bgs)	Elevation (ft)	Description	Sample No.	Type	Blows per 6"	N value	Comments	Dry density (pcf)	Max. dry density (pcf)	Percent fines (%)	Percent gravel (%)	Moist. content (%)	Opt. moist. content (%)	Liquid limit	Plastic limit	Plasticity index
	-28	POORLY-GRADED SILTY SAND (SM) Gray, saturated, fine sand, (0, 70, 30), shell fragments			21											
	-29															
	-30															
	-31															
	-32		B-1-10		11 16 16	32										
35	-33	POORLY-GRADED SILTY SAND (SM) Dark gray, saturated, fine sand, (0, 70, 30), shell fragments														
	-34															
	-35															
	-36		B-1-11		4 6 9	15	Silty clay (CL) in cuttings at 38-39 ft bgs									
40	-37	SANDY SILT (ML) Dark gray, saturated, fine sand, (0, 43, 57), shell fragments														
	-38															
	-39															
	-40															
	-41		B-1-12		5 7 12	19				56.7		31.7				
45	-42	POORLY-GRADED SILTY SAND (SM) Dark gray, saturated, fine sand, (0, 80, 20), shell fragments														
	-43															
	-44															
	-45															
	-46		B-1-13		4 6 10	16										
50	-47	POORLY-GRADED SILTY SAND (SM) Dark gray, saturated, fine sand, (0, 60, 40), shell fragments														
	-48															
	-49	Bottom of boring at 50.5 ft														
	-50															
	-51															
55	-52															
	-53															
	-54															
	-55															
	-56															
60	-57															

CONTRACTOR Gregg Drilling
EQUIPMENT Fraste MD/XL
DRILL MTHD Mud Rotary
DIAMETER 3.75 in. OD
LOGGER Alan Witthoeft
REVIEWER Neven Matasovic
NORTHING
EASTING
COORDINATE SYSTEM:

NOTES: West side of Lagoon 1. 140 lb automatic hammer with a drop height of 30 in. was used. Groundwater was not observed.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

Geosyntec consultants
2100 Main St
Suite 150
Huntington Beach, CA 92648
Tel: (714) 969-0800
Fax: (714) 969-0820

GS FORM: GEOTECH2 01/04

BOREHOLE LOG

BORING B-2 **SHEET** 1 **OF** 2
START DRILL DATE Jan 31, 11
FINISH DRILL DATE Jan 31, 11
LOCATION Huntington Beach, CA
PROJECT Ascon IRM
NUMBER HC1243-08

ELEVATION DATA:
GROUND SURF. (Ft) 1.4
TOP OF CASING (Ft)
DATUM MSL

DEPTH (ft-bgs) | ELEVATION (ft) | DESCRIPTION (1) Soil Name (USCS) (2) Color (3) Moisture (4) Grain Size (5) Percentage (6) Plasticity (7) Density/Consistency (8) Other (Mineral Content, Discoloration, Odor, etc.) | GRAPHIC LOG | SAMPLE: SAMPLE NO. | TYPE | BLOWS PER 6" | N VALUE | RECOVERY (%) | PID READING (ppm) | TIME (00:00) | COMMENTS (1) Rig Behavior (2) Air Monitoring (3) Pocket Pen (4) Tor Vane | LABORATORY RESULTS: DRY DENSITY (pcf) | MAX. DRY DENSITY (pcf) | PERCENT FINES (%) | PERCENT GRAVEL (%) | MOIST. CONTENT (%) | OPT. MOIST. CONTENT (%) | ATTERBERG LIMITS: LIQUID LIMIT | PLASTIC LIMIT | PLASTICITY INDEX

Depth (ft-bgs)	Elevation (ft)	Description	Sample No.	Type	Blows per 6"	N value	Comments	Dry density (pcf)	Max. dry density (pcf)	Percent fines (%)	Percent gravel (%)	Moist. content (%)	Opt. moist. content (%)	Liquid limit	Plastic limit	Plasticity index
	1	HIGH-PLASTICITY SILT (MH) Dark gray, moist, fine sand (0, 25, 75)	B-2-1						111.4	73.7		50.7	12.0	58		26
	0		B-2-2					87.1				30.1				
	-1	SILTY CLAYEY SAND (SC) Dark gray, saturated, fine to medium sand (0, 75, 25), low plasticity														
	-2															
	-3		B-2-3		5 7 7	14										
5	-4	POORLY-GRADED SILTY SAND (SM) Gray, saturated, fine sand (0, 80, 20), shell fragments														
	-5															
	-6															
	-7															
	-8		B-2-4		7 11 13	24										
10	-9	POORLY-GRADED SAND WITH SILT (SP-SM) Gray, saturated, fine sand (0, 90, 10), shell fragments														
	-10															
	-11						Coarser sand at 12-13 ft bgs									
	-12	WELL-GRADED SAND WITH SILT (SW) Gray, saturated, fine to coarse sand, trace fine gravel, (0, 90, 10), shell fragments														
	-13		B-2-5		8 9 10	19										
15	-14	POORLY-GRADED SILTY SAND (SM) Gray, saturated, fine sand (0, 80, 20), shell fragments														
	-15															
	-16															
	-17															
	-18		B-2-6		9 13 15	28										
20	-19	POORLY-GRADED SILTY SAND (SM) Gray, saturated, fine sand (0, 80, 20), shell fragments														
	-20															
	-21															
	-22															
	-23		B-2-7		6 11 14	25				22.3		22.9				
25	-24	POORLY-GRADED SILTY SAND (SM) Gray, saturated, fine sand (1, 77, 22), shell fragments														
	-25															
	-26															
	-27															
	-28		B-2-8		10 16	39										
30																

CONTRACTOR Gregg Drilling
EQUIPMENT Fraste MD/XL
DRILL MTHD Mud Rotary
DIAMETER 3.75 in. OD
LOGGER Alan Witthoeft
REVIEWER Neven Matasovic
NORTHING
EASTING
COORDINATE SYSTEM:

NOTES: East side of Lagoon 1. 140 lb automatic hammer with a drop height of 30 in. was used. Groundwater observed at surface in hand auger hole (approx. 0.2 ft bgs).

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

Geosyntec consultants
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Huntington Beach, CA 92648
Tel: (714) 969-0800
Fax: (714) 969-0820

GS FORM: GEOTECH2 01/04

BOREHOLE LOG

BORING B-2 **SHEET** 2 **OF** 2
START DRILL DATE Jan 31, 11
FINISH DRILL DATE Jan 31, 11
LOCATION Huntington Beach, CA
PROJECT Ascon IRM
NUMBER HC1243-08

ELEVATION DATA:
GROUND SURF. (Ft) 1.4
TOP OF CASING (Ft)
DATUM MSL

DESCRIPTION: 1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)

COMMENTS: 1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	PID READING (ppm)	TIME (00:00)	COMMENTS	DRY DENSITY (pcf)	MAX. DRY DENSITY (pcf)	PERCENT FINES (%)	PERCENT GRAVEL (%)	MOIST. CONTENT (%)	OPT. MOIST. CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
	-29	POORLY-GRADED SILTY SAND (SM) Gray, saturated, fine sand (0, 80, 20), shell fragments			23														
	-30																		
	-31																		
	-32	SILT WITH SAND (ML) Gray, saturated, fine sand (0, 10, 90), shell fragments																	
	-33		B-2-9		4 3 5	8													
35	-34																		
	-35																		
	-36																		
	-37																		
	-38		B-2-10		4 7 12	19							40.9		26.8				
40	-39	SILTY SAND (SM) Gray, saturated, fine sand (1, 58, 41), shell fragments																	
	-40																		
	-41																		
	-42																		
	-43		B-2-11		7 7 12	19													
45	-44	SILTY CLAY (CL) Gray, moist to saturated, fine sand (0, 10, 90), low plasticity																	
	-45																		
	-46																		
	-47	POORLY-GRADED SILTY SAND (SM) Gray, saturated, fine sand (0, 80, 20), shell fragments																	
	-48		B-2-12		18 23 28	51													
50	-49																		
		Bottom of boring at 50.5 ft bgs																	
	-50																		
	-51																		
	-52																		
	-53																		
55	-54																		
	-55																		
	-56																		
	-57																		
	-58																		
60																			

CONTRACTOR Gregg Drilling
EQUIPMENT Fraste MD/XL
DRILL MTHD Mud Rotary
DIAMETER 3.75 in. OD
LOGGER Alan Witthoeft
NORTHING
EASTING
COORDINATE SYSTEM:
REVIEWER Neven Matasovic

NOTES: East side of Lagoon 1. 140 lb automatic hammer with a drop height of 30 in. was used. Groundwater observed at surface in hand auger hole (approx. 0.2 ft bgs).

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

Geosyntec consultants
2100 Main St
Suite 150
Huntington Beach, CA 92648
Tel: (714) 969-0800
Fax: (714) 969-0820

GS FORM: GEOTECH2 01/04

BOREHOLE LOG

BORING B-3 **SHEET** 1 **OF** 2
START DRILL DATE Feb 1, 11
FINISH DRILL DATE Feb 1, 11
LOCATION Huntington Beach, CA
PROJECT Ascon IRM
NUMBER HC1243-08

ELEVATION DATA:
GROUND SURF. (Ft) 3.5
TOP OF CASING (Ft)
DATUM MSL

DEPTH (ft-bgs) | ELEVATION (ft) | DESCRIPTION (1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.) | GRAPHIC LOG

SAMPLE: SAMPLE NO. | TYPE | BLOWS PER 6" | N VALUE | RECOVERY (%) | PID READING (ppm) | TIME (00:00)

COMMENTS: 1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane

LABORATORY RESULTS: DRY DENSITY (pcf) | MAX. DRY DENSITY (pcf) | PERCENT FINES (%) | PERCENT GRAVEL (%) | MOIST. CONTENT (%) | OPT. MOIST. CONTENT (%) | ATTERBERG LIMITS: LIQUID LIMIT | PLASTIC LIMIT | PLASTICITY INDEX

Depth (ft-bgs)	Elevation (ft)	Description	Sample No.	Type	Blows per 6"	N value	Comments	Max. dry density (pcf)	Percent fines (%)	Moist. content (%)	Opt. moist. content (%)	Liquid limit	Plastic limit	Plasticity index
	3	HIGH-PLASTICITY SILT (MH) Gray, moist to saturated, fine sand (5, 15, 80)	B-3-1					109.2	81.6	39.0	15.9			
	2		B-3-2				Trace sand and gravel at 1.5-2 ft bgs							
	1		B-3-3						86.2	55.9		69		17
	0													
	-1		B-3-4		0 0 5	5								
5	-2	POORLY-GRADED SILTY SAND (SM) Gray, saturated, fine sand (0, 80, 20), shell fragments												
	-3													
	-4													
	-5													
	-6		B-3-5		5 4 5	9								
10	-7	POORLY-GRADED SILTY SAND (SM) Gray, saturated, fine sand (0, 80, 20), shell fragments												
	-8													
	-9													
	-10	POORLY-GRADED SILTY SAND (SP-SM) Gray, saturated, fine to medium sand (0, 90, 10), shell fragments												
	-11		B-3-6		10 13 18	31								
15	-12													
	-13													
	-14													
	-15													
	-16		B-3-7		8 9 11	20								
20	-17	POORLY-GRADED SILTY SAND (SM) Gray, saturated, fine sand (0, 60, 40), shell fragments												
	-18													
	-19													
	-20	POORLY-GRADED SILTY SAND (SM) Gray, saturated, fine sand (0, 70, 30), shell fragments												
	-21		B-3-8		9 8 8	16								
25	-22													
	-23													
	-24													
	-25													
	-26		B-3-9		18 25	55								
30														

CONTRACTOR Gregg Drilling
EQUIPMENT Fraste MD/XL
DRILL MTHD Mud Rotary
DIAMETER 3.75 in. OD
LOGGER Alan Witthoeft
REVIEWER Neven Matasovic
NORTHING
EASTING
COORDINATE SYSTEM:

NOTES: West side of Lagoon 2. 140 lb automatic hammer with a drop height of 30 in. was used. Groundwater was not observed.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

Geosyntec consultants
2100 Main St
Suite 150
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Tel: (714) 969-0800
Fax: (714) 969-0820

GS FORM: GEOTECH2 01/04

BOREHOLE LOG

BORING B-3 **SHEET** 2 **OF** 2
START DRILL DATE Feb 1, 11
FINISH DRILL DATE Feb 1, 11
LOCATION Huntington Beach, CA
PROJECT Ascon IRM
NUMBER HC1243-08

ELEVATION DATA:
GROUND SURF. (Ft) 3.5
TOP OF CASING (Ft)
DATUM MSL

DEPTH (ft-bgs) | ELEVATION (ft) | DESCRIPTION (1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.) | GRAPHIC LOG | SAMPLE: SAMPLE NO. | TYPE | BLOWS PER 6" | N VALUE | RECOVERY (%) | PID READING (ppm) | TIME (00:00) | COMMENTS (1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane | LABORATORY RESULTS: DRY DENSITY (pcf) | MAX. DRY DENSITY (pcf) | PERCENT FINES (%) | PERCENT GRAVEL (%) | MOIST. CONTENT (%) | OPT. MOIST. CONTENT (%) | ATTERBERG LIMITS: LIQUID LIMIT | PLASTIC LIMIT | PLASTICITY INDEX

Depth (ft-bgs)	Elevation (ft)	Description	Sample No.	Type	Blows per 6"	N value	Comments	Dry density (pcf)	Max. dry density (pcf)	Percent fines (%)	Percent gravel (%)	Moist. content (%)	Opt. moist. content (%)	Liquid limit	Plastic limit	Plasticity index
	-27	POORLY-GRADED SILTY SAND (SM) Gray, saturated, fine sand (0, 70, 30), shell fragments			30											
	-28															
	-29															
	-30															
	-31		B-3-10		13 18 26	44										
35	-32															
	-33															
	-34	SILTY CLAY (CL) Dark gray, saturated, fine sand (0, 5, 95), low plasticity, shell fragments														
	-35															
	-36		B-3-11		4 8 11	19										
40	-37	POORLY-GRADED SILTY SAND (SM) Gray, saturated, fine sand (0, 60, 40), shell fragments														
	-38															
	-39						Silty clay (CL) in cuttings at 42 ft bgs									
	-40															
	-41		B-3-12		16 20 29	49				34.9		28.0				
45	-42	POORLY-GRADED SILTY SAND (SM) Gray, saturated, fine sand (0, 65, 35), shell fragments														
	-43															
	-44															
	-45						Silty clay (CL) in cuttings at 48 ft bgs									
	-46		B-3-13		15 14 23	37										
50	-47	Bottom of boring at 50.5 ft bgs														
	-48															
	-49															
	-50															
	-51															
55	-52															
	-53															
	-54															
	-55															
	-56															
60																

CONTRACTOR Gregg Drilling
EQUIPMENT Fraste MD/XL
DRILL MTHD Mud Rotary
DIAMETER 3.75 in. OD
LOGGER Alan Witthoeft
REVIEWER Neven Matasovic
NORTHING
EASTING
COORDINATE SYSTEM:

NOTES: West side of Lagoon 2. 140 lb automatic hammer with a drop height of 30 in. was used. Groundwater was not observed.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

Geosyntec consultants
2100 Main St
Suite 150
Huntington Beach, CA 92648
Tel: (714) 969-0800
Fax: (714) 969-0820

GS FORM: GEOTECH2 01/04

BOREHOLE LOG

BORING B-4 **SHEET** 1 **OF** 2
START DRILL DATE Feb 1, 11
FINISH DRILL DATE Feb 1, 11
LOCATION Huntington Beach, CA
PROJECT Ascon IRM
NUMBER HC1243-08

ELEVATION DATA:
GROUND SURF. (Ft) 2.7
TOP OF CASING (Ft)
DATUM MSL

DESCRIPTION: 1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)

COMMENTS: 1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	PID READING (ppm)	TIME (00:00)	COMMENTS	DRY DENSITY (pcf)	MAX. DRY DENSITY (pcf)	PERCENT FINES (%)	PERCENT GRAVEL (%)	MOIST. CONTENT (%)	OPT. MOIST. CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
	2	SILTY CLAY (CH) Greenish gray, saturated, fine sand (0, 1, 99), soft	B-4-1																
	1		B-4-2								69.6		99.8		50.9		61		32
	0	SILTY CLAYEY SAND (SC) Fine sand (0, 60, 40), low plasticity	B-4-3		5 6 9	15													
	-1																		
	-2	POORLY-GRADED SILTY SAND (SM) Dark gray, fine sand (0, 70, 30), saturated	B-4-4		3 4 4	8				Non-plastic at 4 ft bgs									
5	-3																		
	-4																		
	-5	POORLY-GRADED SILTY SAND (SM) Gray, saturated, fine to medium sand (1, 93, 6)																	
	-6																		
	-7		B-4-5		7 11 15	26							6.4		22.2				
10	-8																		
	-9																		
	-10																		
	-11																		
	-12		B-4-6		9 13 14	27													
15	-13	POORLY-GRADED SILTY SAND (SP-SM) Gray, saturated, medium sand (0, 90, 10), shell fragments																	
	-14																		
	-15	POORLY-GRADED SILTY SAND (SM) Gray, saturated, fine sand (0, 80, 20), shell fragments																	
	-16																		
	-17		B-4-7		8 13 17	30													
20	-18																		
	-19																		
	-20																		
	-21																		
	-22		B-4-8		8 13 16	29							19.4		23.6				
25	-23	POORLY-GRADED SILTY SAND (SM) Gray, saturated, fine sand (3, 78, 19), shell fragments																	
	-24																		
	-25																		
	-26																		
	-27		B-4-9		12 14	36													
30																			

CONTRACTOR Gregg Drilling
EQUIPMENT Fraste MD/XL
DRILL MTHD Mud Rotary
DIAMETER 3.75 in. OD
LOGGER Alan Witthoeft
REVIEWER Neven Matasovic
NORTHING
EASTING
COORDINATE SYSTEM:

NOTES: East side of Lagoon 2. 140 lb automatic hammer with a drop height of 30 in. was used. Groundwater observed approx. 0.1 ft below surface in hand auger hole.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

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GS FORM: GEOTECH2 01/04

BOREHOLE LOG

BORING B-4 **SHEET** 2 **OF** 2
START DRILL DATE Feb 1, 11
FINISH DRILL DATE Feb 1, 11
LOCATION Huntington Beach, CA
PROJECT Ascon IRM
NUMBER HC1243-08

ELEVATION DATA:
GROUND SURF. (Ft) 2.7
TOP OF CASING (Ft)
DATUM MSL

DEPTH (ft-bgs) | ELEVATION (ft) | DESCRIPTION (1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.) | GRAPHIC LOG | SAMPLE: SAMPLE NO. | TYPE | BLOWS PER 6" | N VALUE | RECOVERY (%) | PID READING (ppm) | TIME (00:00) | COMMENTS (1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane | LABORATORY RESULTS: DRY DENSITY (pcf) | MAX. DRY DENSITY (pcf) | PERCENT FINES (%) | PERCENT GRAVEL (%) | MOIST. CONTENT (%) | OPT. MOIST. CONTENT (%) | ATTERBERG LIMITS: LIQUID LIMIT | PLASTIC LIMIT | PLASTICITY INDEX

Depth (ft-bgs)	Elevation (ft)	Description	Sample No.	Blows per 6"	N value	Comments
	-28	POORLY-GRADED SILTY SAND (SP-SM) Gray, saturated, fine sand (0, 90, 10), shell fragments		22		
	-29					
	-30					
	-31					
	-32		B-4-10	9 4 5	9	
35	-33	SILTY CLAY (CL) Gray, moist to saturated, fine sand (0, 10, 90), low plasticity, shell fragments				Silty clay (CL) in cuttings at 36-39 ft bgs
	-34					
	-35					
	-36					
	-37	POORLY-GRADED SILTY SAND (SM) Gray, saturated, fine sand (0, 80, 20), shell fragments	B-4-11	15 22 39	61	
40	-38					
	-39					
	-40					
	-41					
	-42		B-4-12	10 7 6	13	
45	-43	SILTY CLAY (CL) Gray, moist to saturated, fine sand (0, 0-10, 90-100), low plasticity				
	-44					
	-45					
	-46	POORLY-GRADED SILTY CLAYEY SAND (SC) Gray, saturated, fine sand (0, 60, 40), shell fragments				
	-47		B-4-13	6 10 13	23	
50	-48	POORLY-GRADED SILTY SAND (SM) Gray, saturated, fine sand (0, 80, 20), shell fragments				
	-49	Bottom of boring at 50.5 ft bgs				
	-50					
	-51					
	-52					
55	-53					
	-54					
	-55					
	-56					
	-57					
60						

CONTRACTOR Gregg Drilling
EQUIPMENT Fraste MD/XL
DRILL MTHD Mud Rotary
DIAMETER 3.75 in. OD
LOGGER Alan Witthoeft
REVIEWER Neven Matasovic
NORTHING
EASTING
COORDINATE SYSTEM:

NOTES: East side of Lagoon 2. 140 lb automatic hammer with a drop height of 30 in. was used. Groundwater observed approx. 0.1 ft below surface in hand auger hole.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

Geosyntec consultants
2100 Main St
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Fax: (714) 969-0820

GS FORM: GEOTECH2 01/04

BOREHOLE LOG

BORING B-5 **SHEET** 1 **OF** 2
START DRILL DATE Feb 3, 11
FINISH DRILL DATE Feb 3, 11
LOCATION Huntington Beach, CA
PROJECT Ascon IRM
NUMBER HC1243-08

ELEVATION DATA:
GROUND SURF. (Ft) 25.5
TOP OF CASING (Ft) 27.0
DATUM MSL

DEPTH (ft-bgs) | ELEVATION (ft) | DESCRIPTION (1) Soil Name (USCS) (2) Color (3) Moisture (4) Grain Size (5) Percentage (6) Plasticity (7) Density/Consistency (8) Other (Mineral Content, Discoloration, Odor, etc.) | GRAPHIC LOG | SAMPLE: SAMPLE NO. | TYPE | BLOWS PER 6" | N VALUE | RECOVERY (%) | PID READING (ppm) | TIME (00:00) | COMMENTS (1) Rig Behavior (2) Air Monitoring (3) Pocket Pen (4) Tor Vane | LABORATORY RESULTS: DRY DENSITY (pcf) | MAX. DRY DENSITY (pcf) | PERCENT FINES (%) | PERCENT GRAVEL (%) | MOIST. CONTENT (%) | OPT. MOIST. CONTENT (%) | ATTERBERG LIMITS: LIQUID LIMIT | PLASTIC LIMIT | PLASTICITY INDEX

Depth (ft-bgs)	Elevation (ft)	Description	Sample No.	Type	Blows per 6"	N value	Comments	Dry density (pcf)	Max. dry density (pcf)	Percent fines (%)	Percent gravel (%)	Moist. content (%)	Opt. moist. content (%)	Liquid limit	Plastic limit	Plasticity index
	25	Empty casing (through silty sand) to 9.5 ft bgs														
	24															
	23															
	22															
	21															
5	20															
	19															
	18															
	17															
	16															
10	15	SILTY SAND (SM) (0. 70, 30)														
	14															
	13		B-5-1													
	12	SILTY CLAY (CH) Olive, saturated, (0, 9, 91), very soft to soft	B-5-2		0 0 1	1										
15	11															
	10		B-5-3													
	9															
	8		B-5-4		0 0 0	0				91.4		69.4		59		32
	7						Bottom of 12-in. PVC casing at 18.5 ft bgs									
	6															
20	5		B-5-5		6 7 9	16										
	4	POORLY-GRADED SILTY SAND (SM) Olive to gray, saturated, fine sand (0, 70, 30)														
	3		B-5-6		5 2 3	5										
	2	HIGH-PLASTICITY SILT (MH) Olive, saturated, (0, 7, 93), soft to stiff														
	1															
25	0		B-5-7		1 1 1	2				93.3		61.8		77		32
	-1															
	-2		B-5-8		0 0 0	0										
	-3	POORLY-GRADED SILTY SAND (SM) Dark gray, saturated, fine sand (0, 70, 30), shell fragments														
	-4															
30																

CONTRACTOR Gregg Drilling
EQUIPMENT Fraste MD/XL
DRILL MTHD Mud Rotary
DIAMETER 3.75 in. OD
LOGGER Alan Witthoeft
REVIEWER Neven Matasovic
NORTHING
EASTING
COORDINATE SYSTEM:

NOTES: West side of Lagoon 3. 140 lb automatic hammer with a drop height of 30 in. was used. Groundwater was not observed. Drilled through 12-in. PVC casing to 18.5 ft bgs.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

Geosyntec consultants
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GS FORM: GEOTECH2 01/04

BOREHOLE LOG

BORING B-5 **SHEET** 2 **OF** 2
START DRILL DATE Feb 3, 11
FINISH DRILL DATE Feb 3, 11
LOCATION Huntington Beach, CA
PROJECT Ascon IRM
NUMBER HC1243-08

ELEVATION DATA:
GROUND SURF. (Ft) 25.5
TOP OF CASING (Ft) 27.0
DATUM MSL

DESCRIPTION: 1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)

COMMENTS: 1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	PID READING (ppm)	TIME (00:00)	COMMENTS	DRY DENSITY (pcf)	MAX. DRY DENSITY (pcf)	PERCENT FINES (%)	PERCENT GRAVEL (%)	MOIST. CONTENT (%)	OPT. MOIST. CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
	-5		B-5-9		6 3 2	5													
	-6	POORLY-GRADED SAND (SP) Gray, saturated, fine to medium sand (0, 90, 10), shell fragments																	
	-7		B-5-10		5 10 15	25													
	-8																		
	-9																		
35	-10																		
	-11																		
	-12		B-5-11		13 18 19	37							7.0		21.5				
	-13																		
	-14	POORLY-GRADED SAND (SP) Gray to dark gray, saturated, fine to medium sand (0, 90, 10), shell fragments																	
40	-15																		
	-16																		
	-17		B-5-12		15 15 18	33													
	-18																		
	-19																		
45	-20																		
	-21																		
	-22		B-5-13		13 16 19	35													
	-23																		
	-24	Bottom of boring at 49 ft bgs																	
50	-25																		
	-26																		
	-27																		
	-28																		
	-29																		
55	-30																		
	-31																		
	-32																		
	-33																		
	-34																		
60																			

CONTRACTOR Gregg Drilling
EQUIPMENT Fraste MD/XL
DRILL MTHD Mud Rotary
DIAMETER 3.75 in. OD
LOGGER Alan Witthoeft
REVIEWER Neven Matasovic
NORTHING
EASTING
COORDINATE SYSTEM:

NOTES: West side of Lagoon 3. 140 lb automatic hammer with a drop height of 30 in. was used. Groundwater was not observed. Drilled through 12-in. PVC casing to 18.5 ft bgs.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

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Tel: (714) 969-0800
Fax: (714) 969-0820

GS FORM: GEOTECH2 01/04

BOREHOLE LOG

BORING B-6 **SHEET** 1 **OF** 2
START DRILL DATE Feb 3, 11
FINISH DRILL DATE Feb 3, 11
LOCATION Huntington Beach, CA
PROJECT Ascon IRM
NUMBER HC1243-08

ELEVATION DATA:
GROUND SURF. (Ft) 24.4
TOP OF CASING (Ft) 25.9
DATUM MSL

DEPTH (ft-bgs) | ELEVATION (ft) | DESCRIPTION (1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.) | GRAPHIC LOG | SAMPLE: SAMPLE NO. | TYPE | BLOWS PER 6" | N VALUE | RECOVERY (%) | PID READING (ppm) | TIME (00:00) | COMMENTS (1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane | LABORATORY RESULTS: DRY DENSITY (pcf) | MAX. DRY DENSITY (pcf) | PERCENT FINES (%) | PERCENT GRAVEL (%) | MOIST. CONTENT (%) | OPT. MOIST. CONTENT (%) | ATTERBERG LIMITS: LIQUID LIMIT | PLASTIC LIMIT | PLASTICITY INDEX

Depth (ft-bgs)	Elevation (ft)	Description	Sample No.	Type	Blows per 6"	N value	Comments	Dry density (pcf)	Max. dry density (pcf)	Percent fines (%)	Percent gravel (%)	Moist. content (%)	Opt. moist. content (%)	Liquid limit	Plastic limit	Plasticity index
	24	Empty casing (through silty sand) to 9 ft bgs														
	23															
	22															
	21															
	20															
5	19															
	18															
	17															
	16															
	15															
10	14															
	13	SILTY SAND (SM) (0. 70, 30)														
	12															
	11		B-6-1		0 0 0	0										
	10	HIGH-PLASTICITY SILT (MH) Olive with black streaks, saturated, (0, 7, 93), very soft														
15	9															
	8															
	7															
	6		B-6-2		0 0 0	0				92.8		71.6		63		21
	5						Bottom of 12-in. PVC casing at 18.5 ft bgs									
20	4															
	3	HIGH-PLASTICITY SILT (MH) Olive, saturated, (0, 1, 99), soft to medium														
	2															
	1		B-6-3		1 2 2	4										
	0															
25	-1		B-6-4							99.3		50.7		70		34
	-2															
	-3															
	-4		B-6-5		0 0 4	4										
	-5	SILTY CLAYEY SAND (SC) Gray, fine sand (0, 60, 40), low plasticity														
30																

CONTRACTOR Gregg Drilling
EQUIPMENT Fraste MD/XL
DRILL MTHD Mud Rotary
DIAMETER 3.75 in. OD
LOGGER Alan Witthoeft
REVIEWER Neven Matasovic
NORTHING
EASTING
COORDINATE SYSTEM:

NOTES: East side of Lagoon 3. 140 lb automatic hammer with a drop height of 30 in. was used. Groundwater was not observed. Drilled through 12-in. PVC casing to 18.5 ft bgs.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

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Huntington Beach, CA 92648
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GS FORM: GEOTECH2 01/04

BOREHOLE LOG

BORING B-6 **SHEET** 2 **OF** 2
START DRILL DATE Feb 3, 11
FINISH DRILL DATE Feb 3, 11
LOCATION Huntington Beach, CA
PROJECT Ascon IRM
NUMBER HC1243-08

ELEVATION DATA:
GROUND SURF. (Ft) 24.4
TOP OF CASING (Ft) 25.9
DATUM MSL

DESCRIPTION: 1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)

COMMENTS: 1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	PID READING (ppm)	TIME (00:00)	COMMENTS	DRY DENSITY (pcf)	MAX. DRY DENSITY (pcf)	PERCENT FINES (%)	PERCENT GRAVEL (%)	MOIST. CONTENT (%)	OPT. MOIST. CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
	-6		B-6-6		5 11 14	25													
	-7	POORLY-GRADED SILTY SAND (SM) Gray, saturated, fine to medium sand (0, 80, 20)								Silty clay (CL) in cuttings									
	-8		B-6-7		11 18 17	35													
	-9																		
	-10	POORLY-GRADED SAND (SP-SM) Gray, saturated, fine to medium sand (0, 90, 10), shell fragments																	
35	-11																		
	-12																		
	-13		B-6-8		14 19 23	42													
	-14																		
	-15																		
40	-16																		
	-17	POORLY-GRADED SILTY SAND (SM) Gray, saturated, fine sand (0, 51, 49), shell fragments																	
	-18																		
	-19		B-6-9		13 14 16	30							48.3		24.8				
	-20																		
45	-21																		
	-22																		
	-23																		
	-24		B-6-10		18 20 19	39													
	-25	Bottom of boring at 49 ft bgs																	
50	-26																		
	-27																		
	-28																		
	-29																		
	-30																		
55	-31																		
	-32																		
	-33																		
	-34																		
	-35																		
60																			

CONTRACTOR Gregg Drilling
EQUIPMENT Fraste MD/XL
DRILL MTHD Mud Rotary
DIAMETER 3.75 in. OD
LOGGER Alan Witthoeft
REVIEWER Neven Matasovic
NORTHING
EASTING
COORDINATE SYSTEM:

NOTES: East side of Lagoon 3. 140 lb automatic hammer with a drop height of 30 in. was used. Groundwater was not observed. Drilled through 12-in. PVC casing to 18.5 ft bgs.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

APPENDIX C

Results of Geotechnical Laboratory Testing

Table 1: Summary of Laboratory Results.

	Classification	Fines Content by Weight (%)	Liquid Limit (%)	Plasticity Index (%)	Dry Unit Weight (pcf)	Moisture Content (%)	Max. Dry Density (pcf)	Opt. Moisture Content (%)	Compression Index (1)	Swelling Index (1)	Hydraulic Conductivity at 2 psi (cm/s)	Hydraulic Conductivity at 20 psi (cm/s)	Drained Friction Angle (°)	Drained Cohesion (psi)	Undrained Shear Strength (psi)
B-1-1	SC	42.5				13.0	127.1	9.3							
B-1-6	SP-SM	7.7				20.3									
B-1-12	ML	56.7				31.7									
B-2-1	MH	73.7	58	26		50.7	111.4	12.0							
B-2-2	MH				87.1	30.1			4.9	0.6	2.6E-06	2.0E-07			
B-2-7	SM	22.3				22.9									
B-2-10	SM	40.9				26.8									
B-3-1	MH	81.6				39.0	109.2	15.9							
B-3-3	MH	86.2	69	17	64.4	55.9			14.8	0.9	2.1E-05	5.2E-07	22	0	
B-3-12	SM	34.9				28.0									
B-4-2	CH	99.8	61	32	69.6	50.9			23.2	1.7	1.9E-07	5.1E-08			4
B-4-5	SP-SM	6.4				22.2									
B-4-8	SM	19.4				23.6									
B-5-4	CH	91.4	59	32		69.4									
B-5-7	MH	93.3	77	32		61.8									
B-5-11	SP-SM	7.0				21.5									
B-6-2	MH	92.8	63	21		71.6									
B-6-4	MH	99.3	70	34	66.8	50.7			12.1	1.1	2.7E-06	2.4E-07	33	0	
B-6-9	SM	48.3				24.8									

Notes:

(1) Strain-based. Effective stress units in psf and log scale base 10.

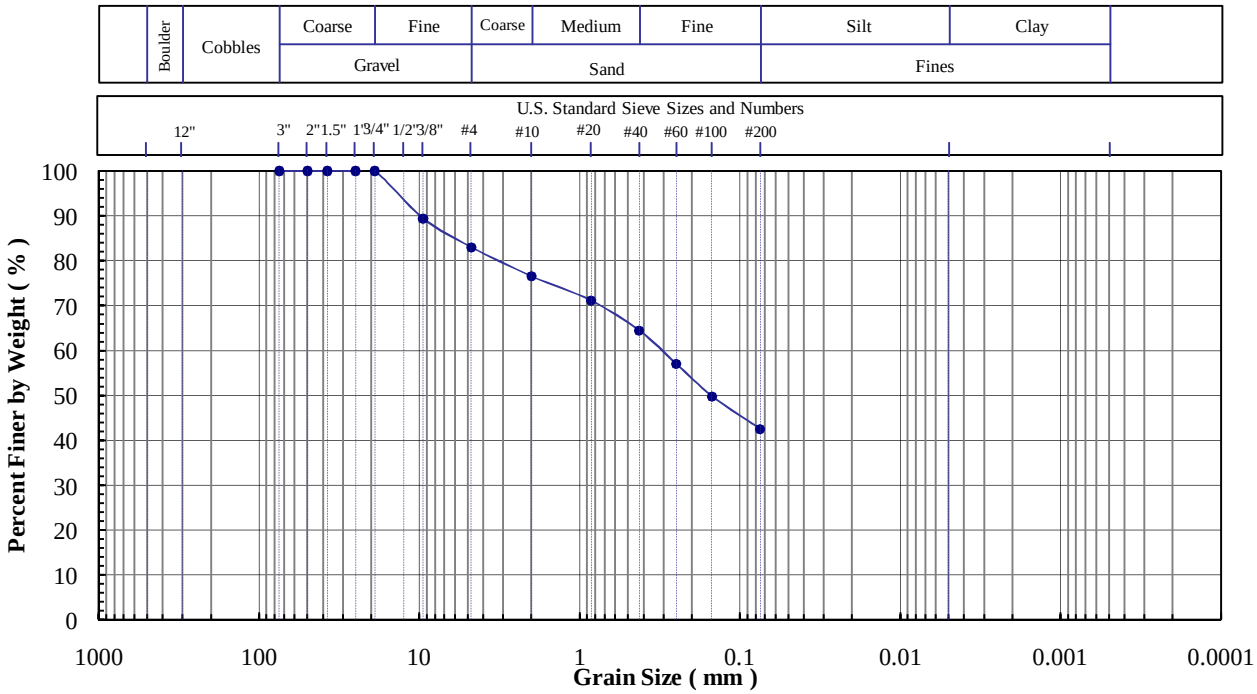
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
941 Forrest Street, Roswell, Georgia 30075
Tel: (770) 650 1666 Fax: (770) 650 5786

Project Name:	Ascon IRM Geotechnical Investigation
Project No:	475
Client Sample ID:	B-1-1
Lab Sample No:	11B306E

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



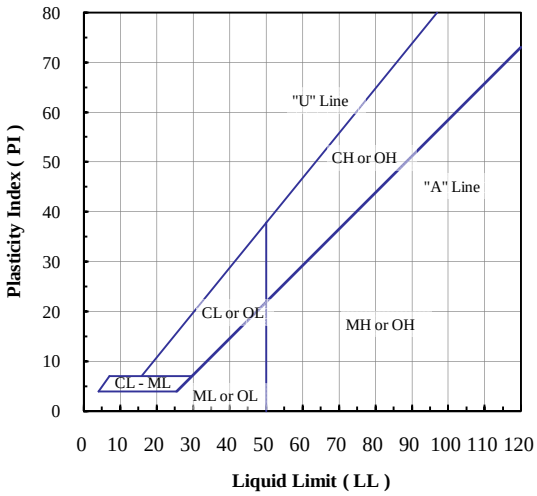
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2 "	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	89.4
#4	4.75	83.0
#10	2.00	76.5
#20	0.850	71.1
#40	0.425	64.4
#60	0.250	57.0
#100	0.150	49.8
#200	0.075	42.5

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	17.0
Sand (%):	40.5
Fines (%):	42.5
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B-1-1	11B306E	13.0	42.5				

Note(s):

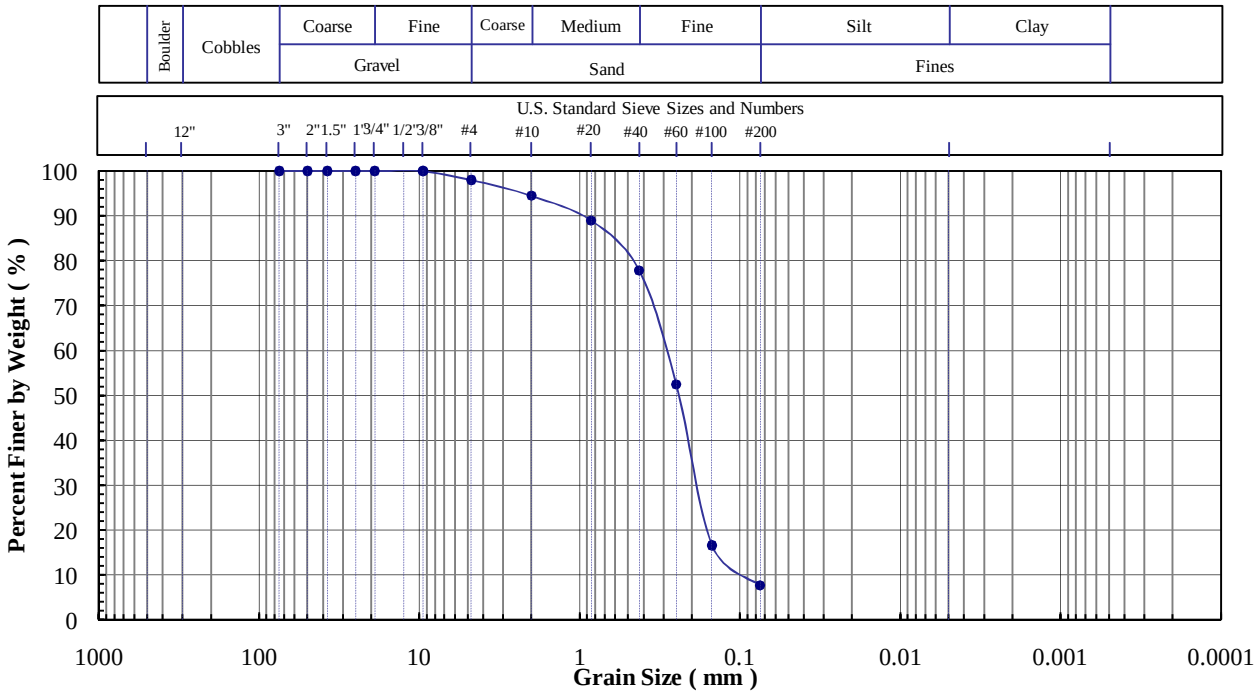
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
941 Forrest Street, Roswell, Georgia 30075
Tel: (770) 650 1666 Fax: (770) 650 5786

Project Name:	Ascon IRM Geotechnical Investigation
Project No:	475
Client Sample ID:	B-1-6
Lab Sample No:	11B307E

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



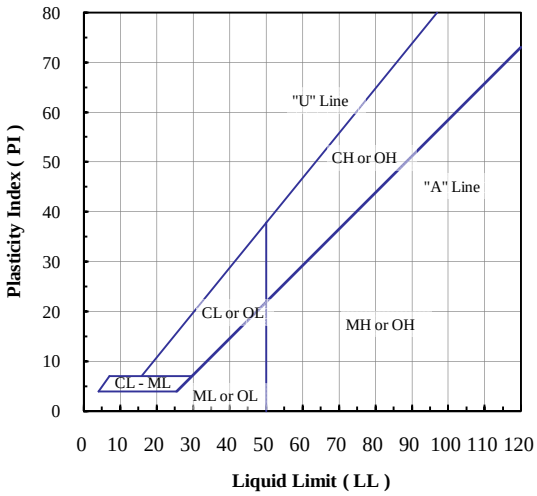
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2 "	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	98.0
#10	2.00	94.5
#20	0.850	89.0
#40	0.425	77.8
#60	0.250	52.4
#100	0.150	16.6
#200	0.075	7.7

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	2.0
Sand (%):	90.3
Fines (%):	7.7
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B-1-6	11B307E	20.3	7.7				

Note(s):

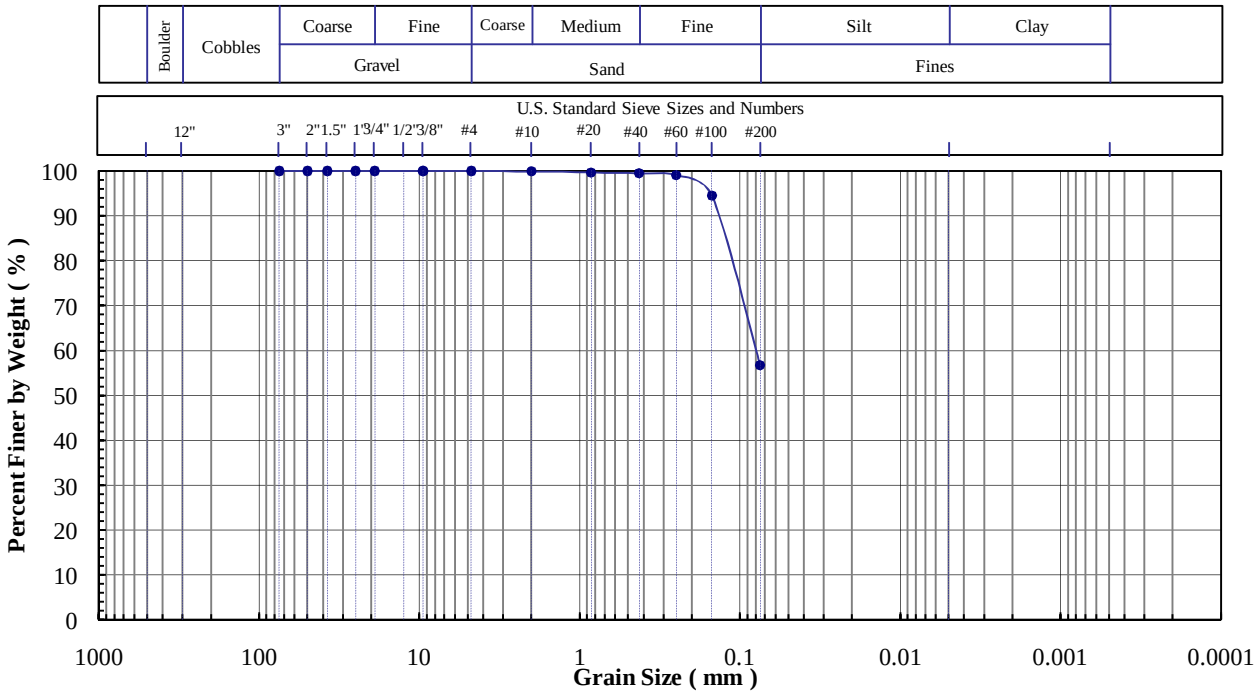
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
941 Forrest Street, Roswell, Georgia 30075
Tel: (770) 650 1666 Fax: (770) 650 5786

Project Name:	Ascon IRM Geotechnical Investigation
Project No:	475
Client Sample ID:	B-1-12
Lab Sample No:	11B308E

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



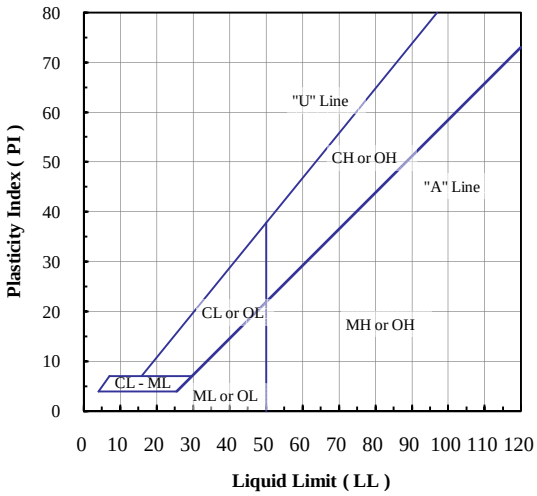
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2 "	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	100.0
#10	2.00	99.9
#20	0.850	99.7
#40	0.425	99.5
#60	0.250	99.1
#100	0.150	94.5
#200	0.075	56.7

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	
Sand (%):	43.3
Fines (%):	56.7
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B-1-12	11B308E	31.7	56.7				

Note(s):

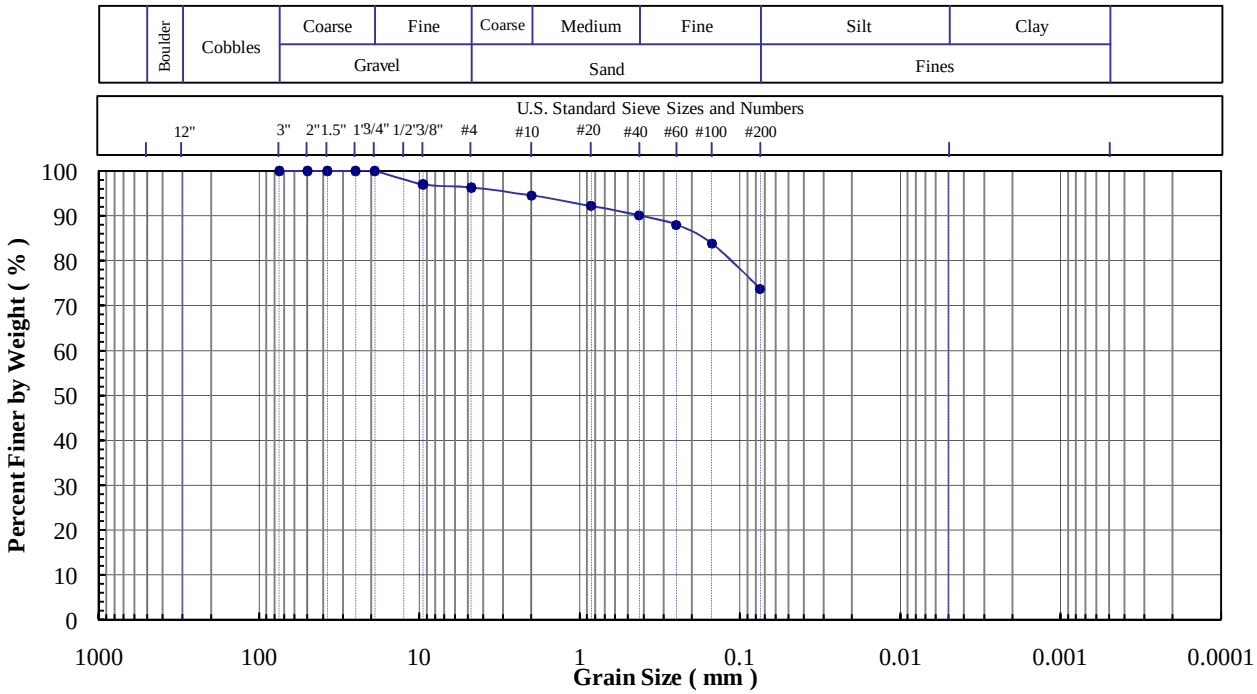
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
941 Forrest Street, Roswell, Georgia 30075
Tel: (770) 650 1666 Fax: (770) 650 5786

Project Name:	Ascon IRM Geotechnical Investigation
Project No:	475
Client Sample ID:	B-2-1
Lab Sample No:	11B309E

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



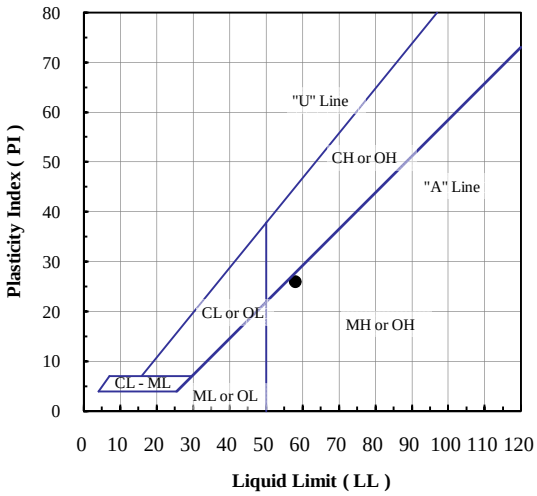
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2 "	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	97.0
#4	4.75	96.3
#10	2.00	94.5
#20	0.850	92.2
#40	0.425	90.1
#60	0.250	88.0
#100	0.150	83.8
#200	0.075	73.7

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	3.7
Sand (%):	22.6
Fines (%):	73.7
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B-2-1	11B309E	50.7	73.7	58	32	26	MH - Silt with sand

Note(s):

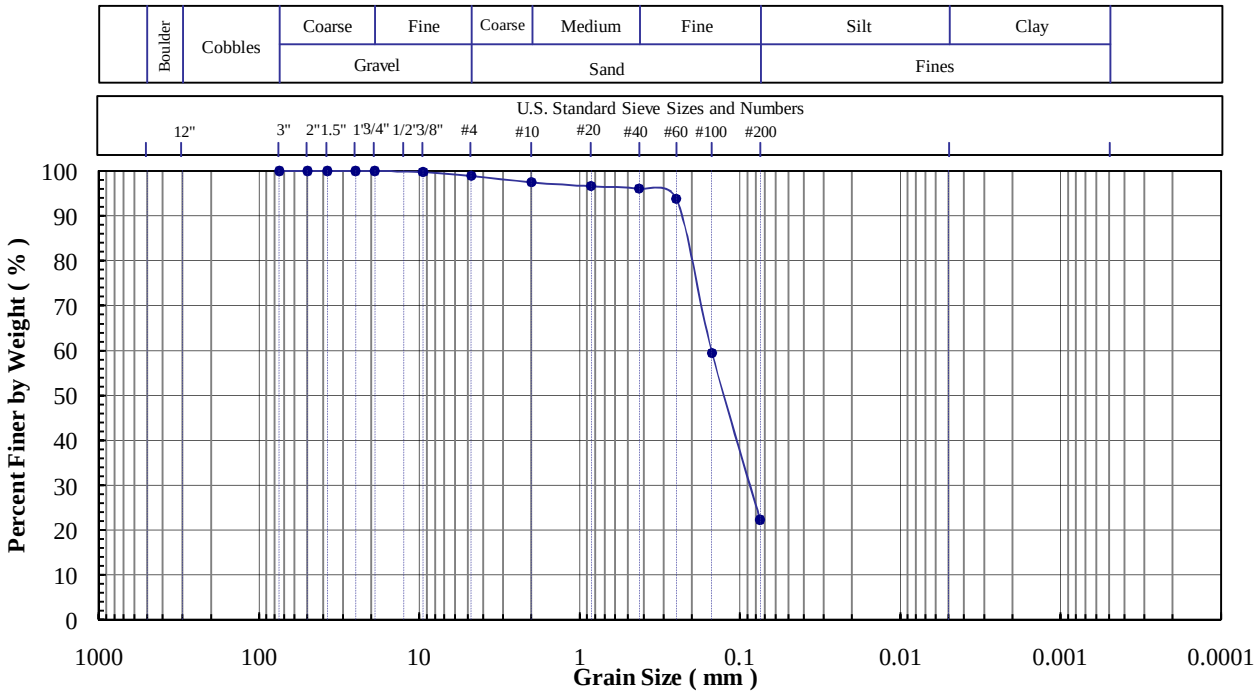
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
941 Forrest Street, Roswell, Georgia 30075
Tel: (770) 650 1666 Fax: (770) 650 5786

Project Name:	Ascon IRM Geotechnical Investigation
Project No:	475
Client Sample ID:	B-2-7
Lab Sample No:	11B310E

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



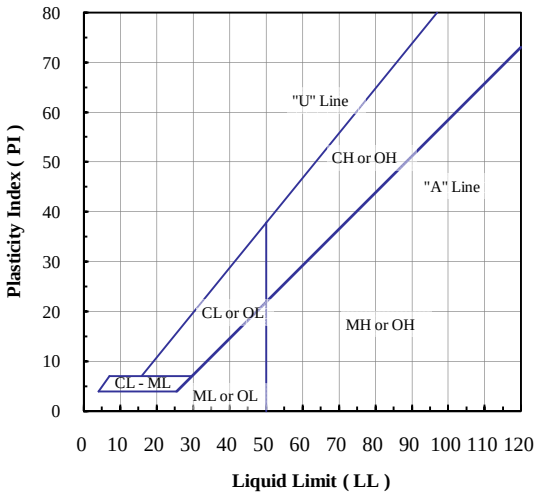
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2 "	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	99.8
#4	4.75	98.9
#10	2.00	97.5
#20	0.850	96.6
#40	0.425	96.1
#60	0.250	93.8
#100	0.150	59.5
#200	0.075	22.3

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	1.1
Sand (%):	76.6
Fines (%):	22.3
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B-2-7	11B310E	22.9	22.3				

Note(s):

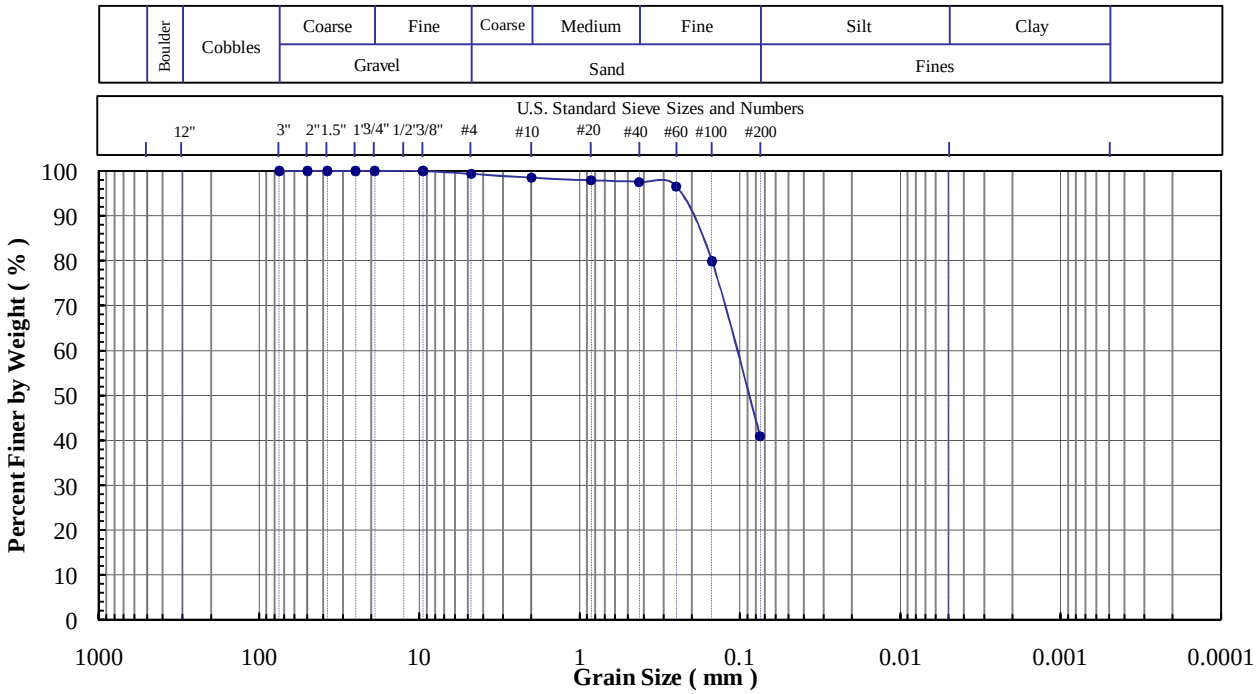
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
941 Forrest Street, Roswell, Georgia 30075
Tel: (770) 650 1666 Fax: (770) 650 5786

Project Name:	Ascon IRM Geotechnical Investigation
Project No:	475
Client Sample ID:	B-2-10
Lab Sample No:	11B311E

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



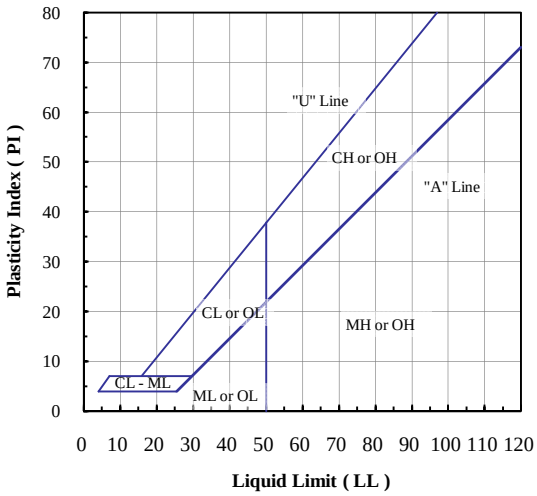
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2 "	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	99.3
#10	2.00	98.5
#20	0.850	97.9
#40	0.425	97.5
#60	0.250	96.5
#100	0.150	79.9
#200	0.075	40.9

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	0.7
Sand (%):	58.4
Fines (%):	40.9
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B-2-10	11B311E	26.8	40.9				

Note(s):

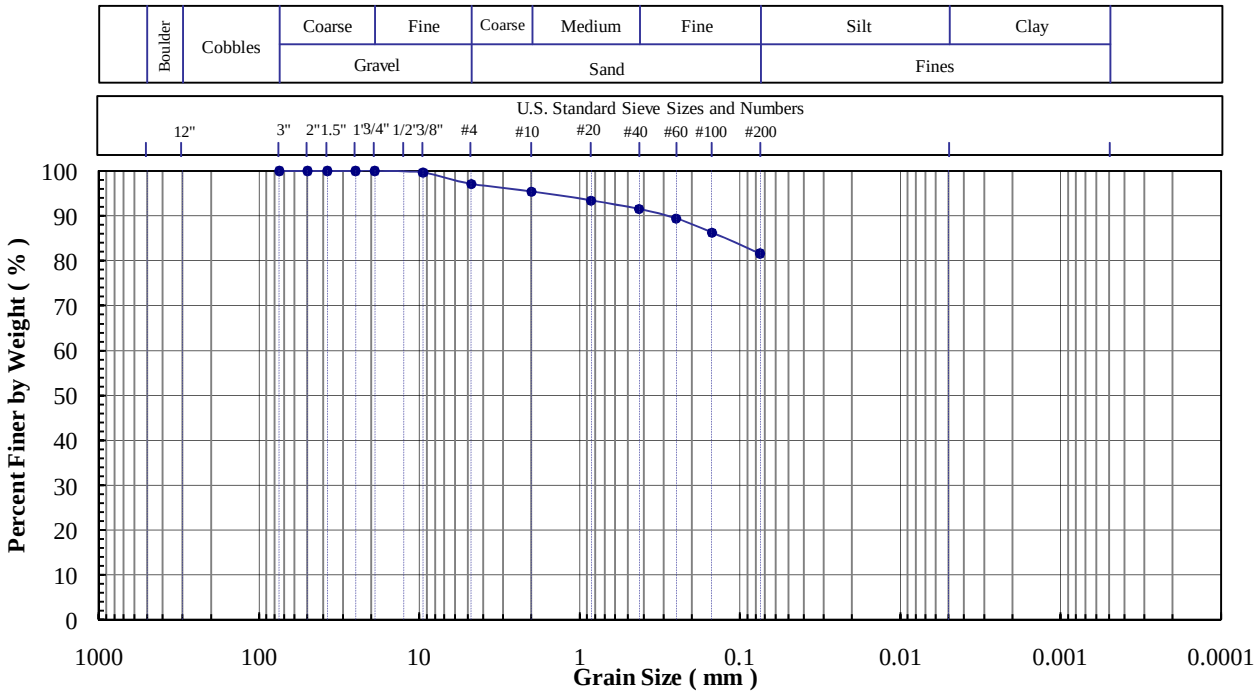
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
941 Forrest Street, Roswell, Georgia 30075
Tel: (770) 650 1666 Fax: (770) 650 5786

Project Name:	Ascon IRM Geotechnical Investigation
Project No:	475
Client Sample ID:	B-3-1
Lab Sample No:	11B312E

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



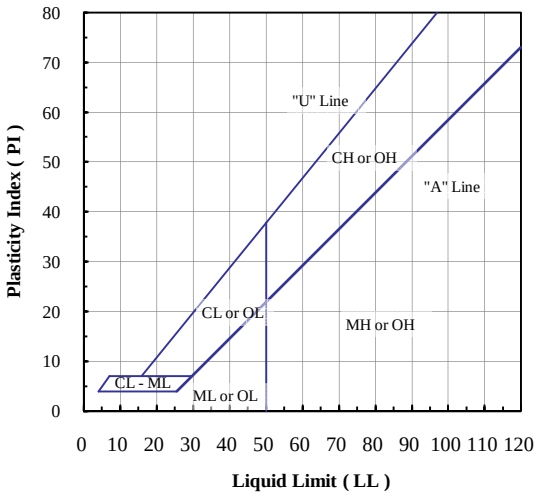
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2 "	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	99.6
#4	4.75	97.1
#10	2.00	95.4
#20	0.850	93.4
#40	0.425	91.5
#60	0.250	89.4
#100	0.150	86.3
#200	0.075	81.6

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	2.9
Sand (%):	15.5
Fines (%):	81.6
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B-3-1	11B312E	39.0	81.6				

Note(s):

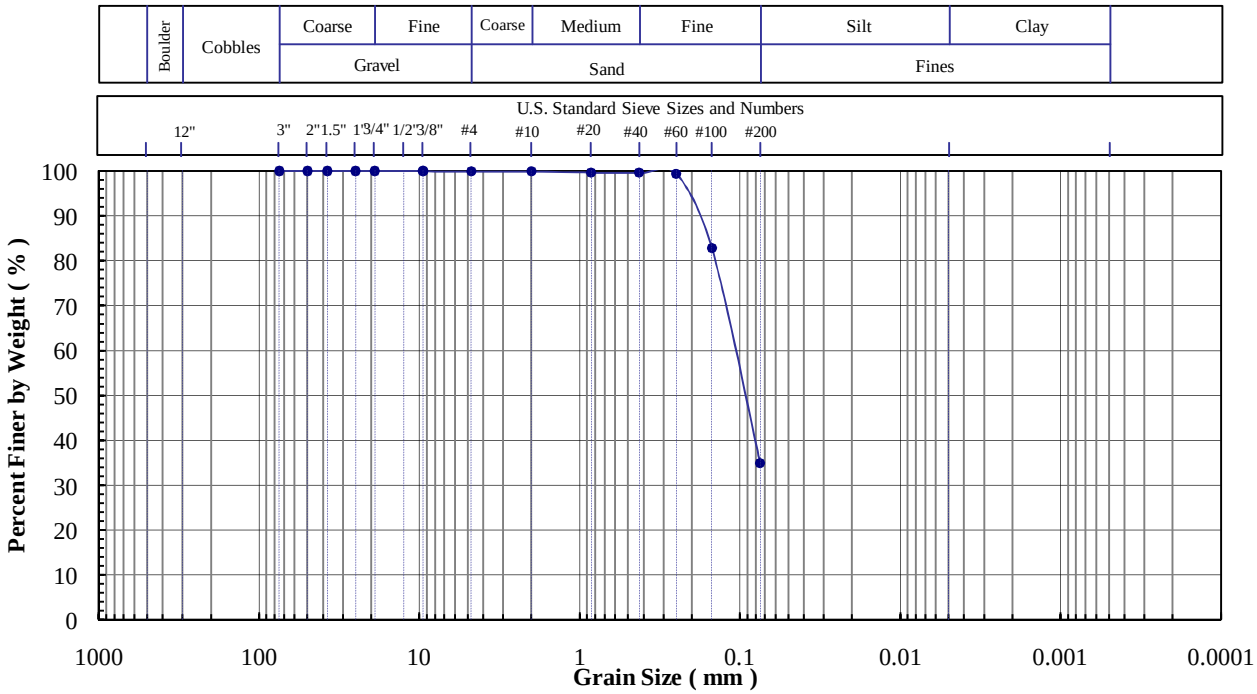
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
941 Forrest Street, Roswell, Georgia 30075
Tel: (770) 650 1666 Fax: (770) 650 5786

Project Name:	Ascon IRM Geotechnical Investigation
Project No:	475
Client Sample ID:	B-3-12
Lab Sample No:	11B313E

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



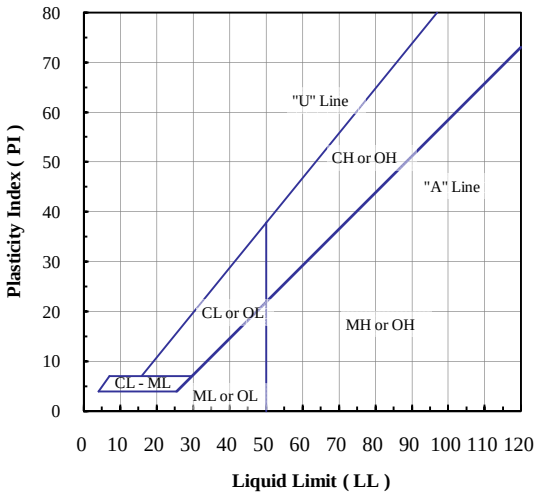
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2 "	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	99.9
#10	2.00	99.9
#20	0.850	99.7
#40	0.425	99.6
#60	0.250	99.4
#100	0.150	82.8
#200	0.075	34.9

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	0.1
Sand (%):	65.0
Fines (%):	34.9
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B-3-12	11B313E	28.0	34.9				

Note(s):

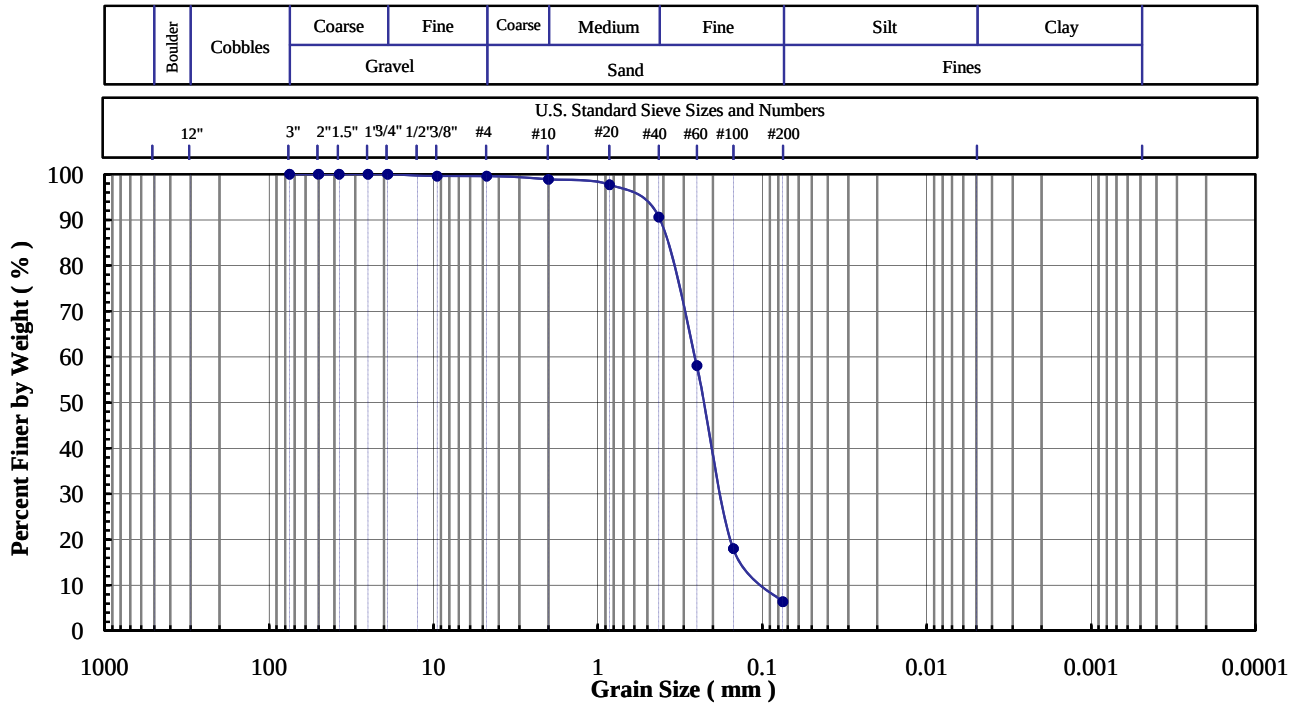
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
941 Forrest Street, Roswell, Georgia 30075
Tel: (770) 650 1666 Fax: (770) 650 5786

Project Name:	Ascon IRM Geotechnical Investigation
Project No:	475
Client Sample ID:	B-4-5
Lab Sample No:	11B314E

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



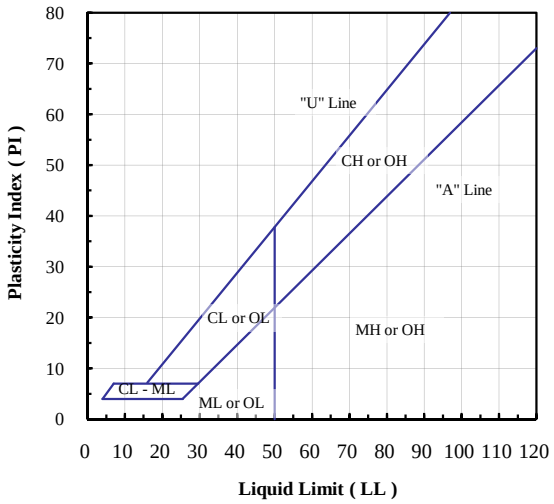
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2 "	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	99.6
#4	4.75	99.6
#10	2.00	98.9
#20	0.850	97.7
#40	0.425	90.6
#60	0.250	58.1
#100	0.150	18.0
#200	0.075	6.4

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	0.4
Sand (%):	93.2
Fines (%):	6.4
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B-4-5	11B314E	22.2	6.4				

Note(s):

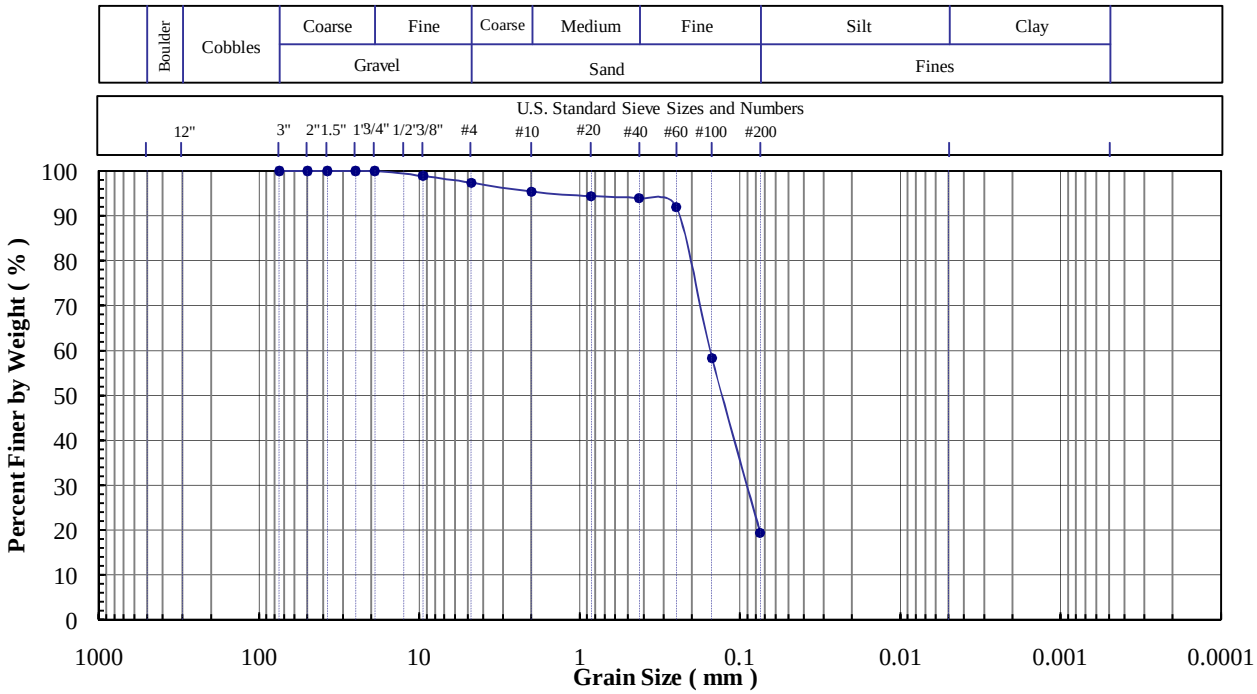
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
941 Forrest Street, Roswell, Georgia 30075
Tel: (770) 650 1666 Fax: (770) 650 5786

Project Name:	Ascon IRM Geotechnical Investigation
Project No:	475
Client Sample ID:	B-4-8
Lab Sample No:	11B315E

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



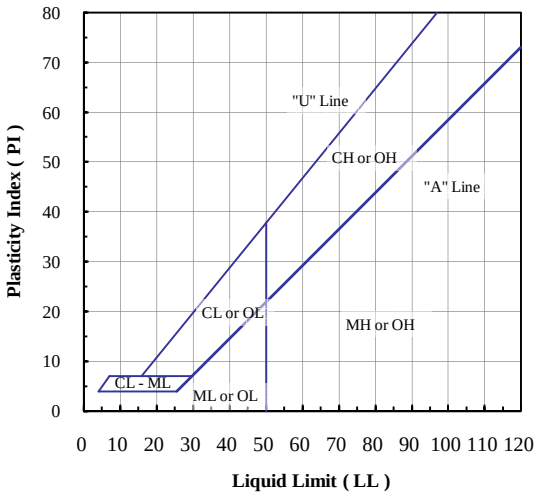
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2 "	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	98.9
#4	4.75	97.4
#10	2.00	95.4
#20	0.850	94.4
#40	0.425	93.9
#60	0.250	91.9
#100	0.150	58.3
#200	0.075	19.4

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	2.6
Sand (%):	78.0
Fines (%):	19.4
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B-4-8	11B315E	23.6	19.4				

Note(s):

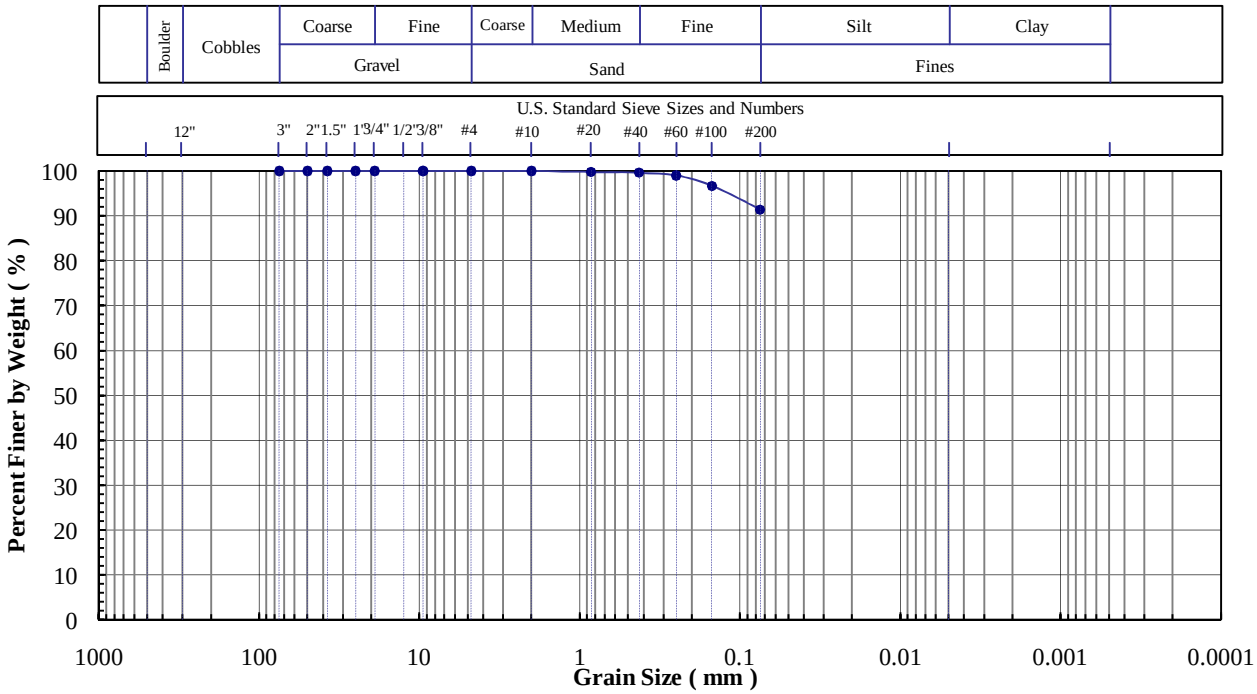
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
941 Forrest Street, Roswell, Georgia 30075
Tel: (770) 650 1666 Fax: (770) 650 5786

Project Name:	Ascon IRM Geotechnical Investigation
Project No:	475
Client Sample ID:	B-5-4
Lab Sample No:	11B316E

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



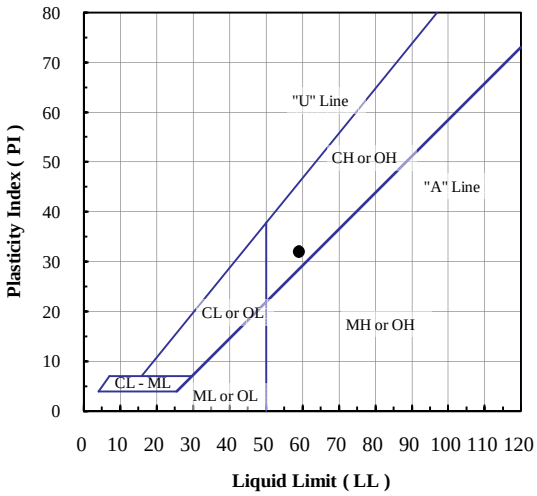
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2 "	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	100.0
#10	2.00	100.0
#20	0.850	99.8
#40	0.425	99.6
#60	0.250	99.0
#100	0.150	96.7
#200	0.075	91.4

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	
Sand (%):	8.6
Fines (%):	91.4
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B-5-4	11B316E	69.4	91.4	59	27	32	CH - Fat clay

Note(s):

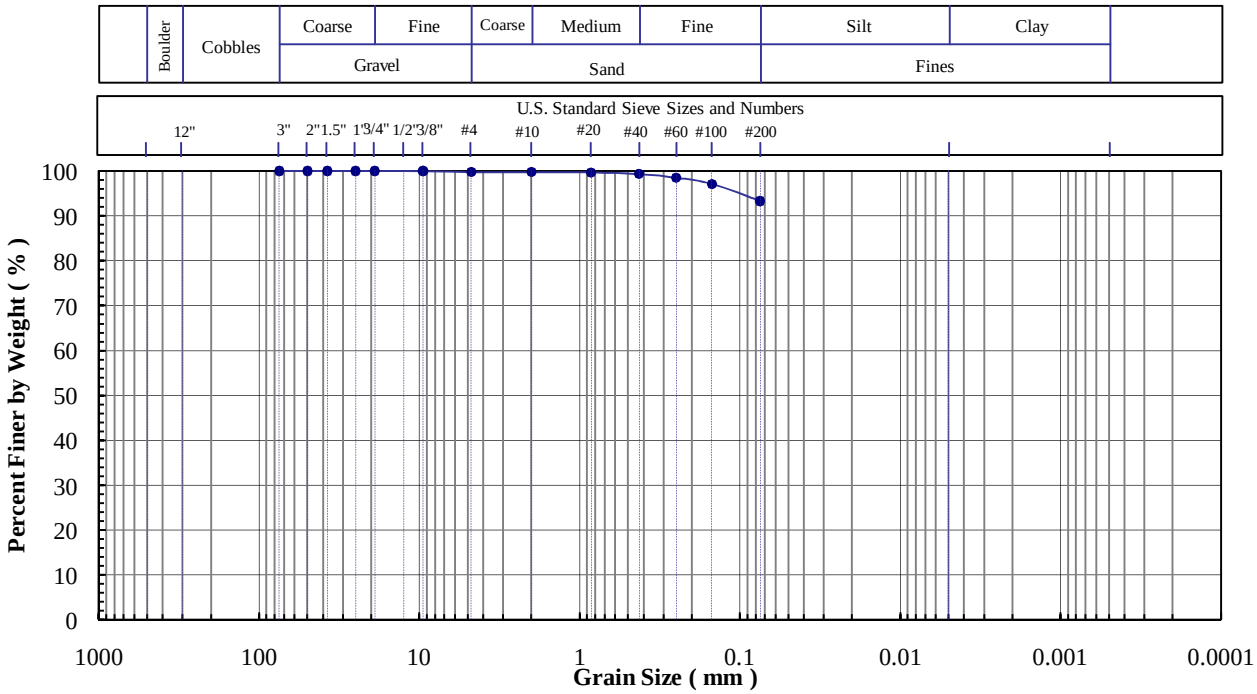
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
941 Forrest Street, Roswell, Georgia 30075
Tel: (770) 650 1666 Fax: (770) 650 5786

Project Name:	Ascon IRM Geotechnical Investigation
Project No:	475
Client Sample ID:	B-5-7
Lab Sample No:	11B317E

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



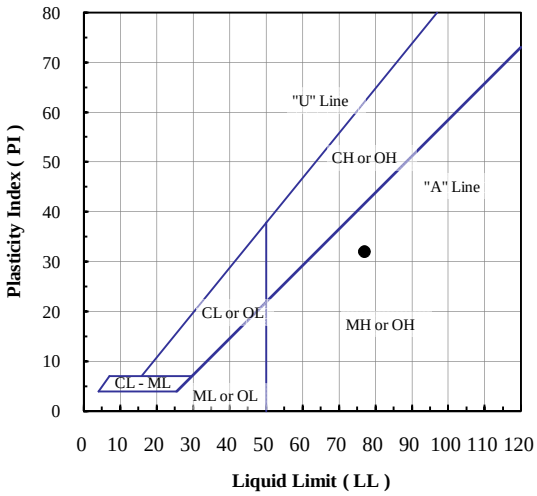
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2 "	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	99.8
#10	2.00	99.8
#20	0.850	99.7
#40	0.425	99.3
#60	0.250	98.5
#100	0.150	97.1
#200	0.075	93.3

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	0.2
Sand (%):	6.5
Fines (%):	93.3
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B-5-7	11B317E	61.8	93.3	77	45	32	MH - Elastic silt

Note(s):

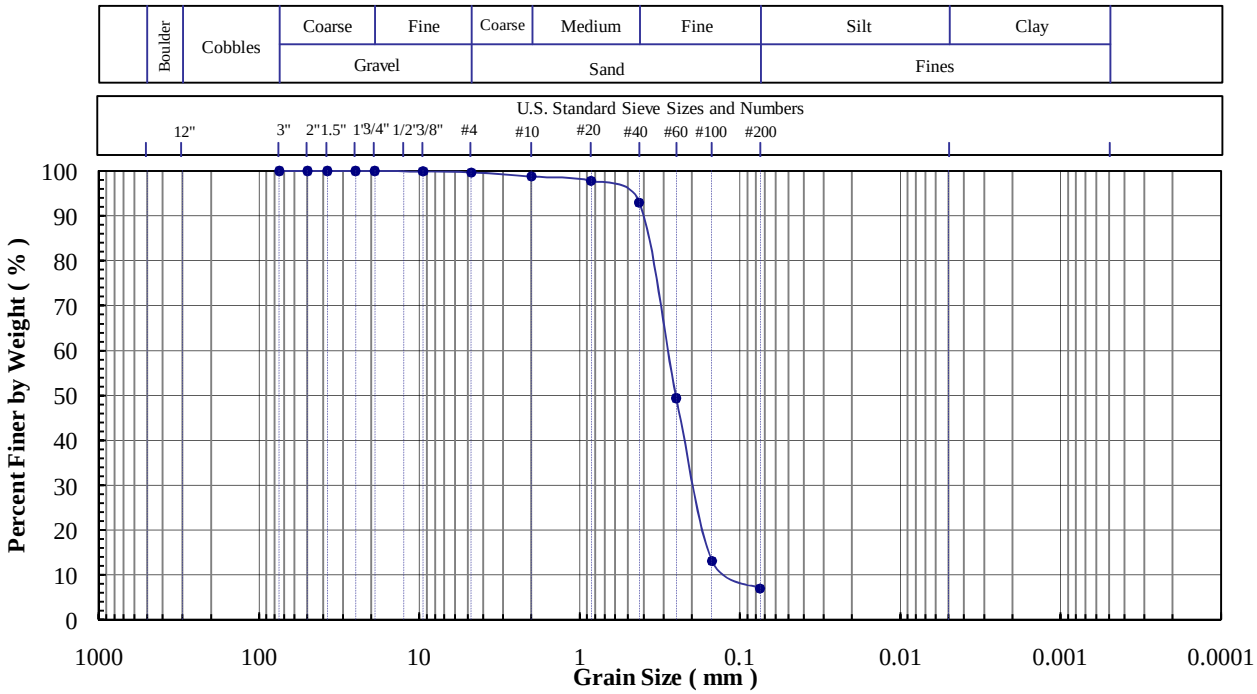
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
941 Forrest Street, Roswell, Georgia 30075
Tel: (770) 650 1666 Fax: (770) 650 5786

Project Name:	Ascon IRM Geotechnical Investigation
Project No:	475
Client Sample ID:	B-5-11
Lab Sample No:	11B318E

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



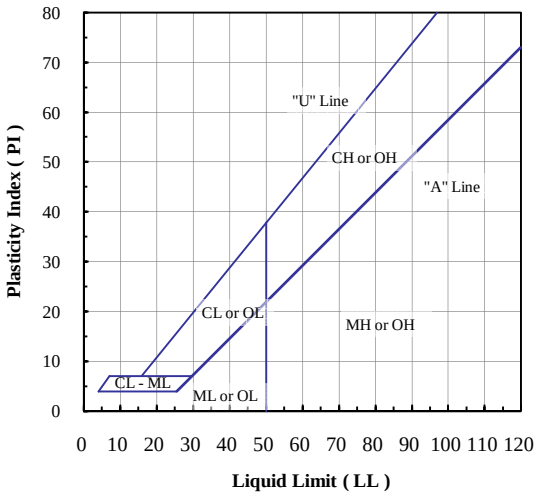
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2 "	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	99.9
#4	4.75	99.7
#10	2.00	98.8
#20	0.850	97.8
#40	0.425	93.0
#60	0.250	49.4
#100	0.150	13.1
#200	0.075	7.0

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	0.3
Sand (%):	92.7
Fines (%):	7.0
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B-5-11	11B318E	21.5	7.0				

Note(s):

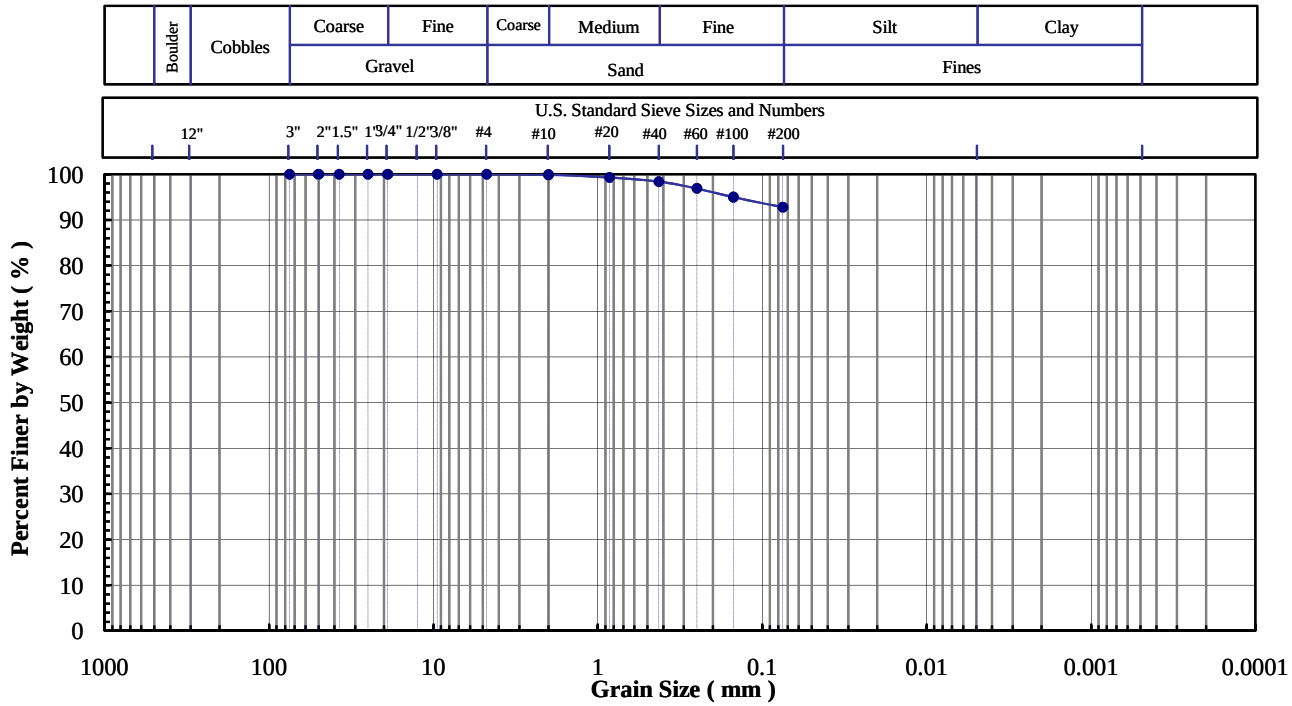
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
941 Forrest Street, Roswell, Georgia 30075
Tel: (770) 650 1666 Fax: (770) 650 5786

Project Name: Ascon IRM Geotechnical Investigation
Project No: 475
Client Sample ID: B-6-2
Lab Sample No: 11B319E

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



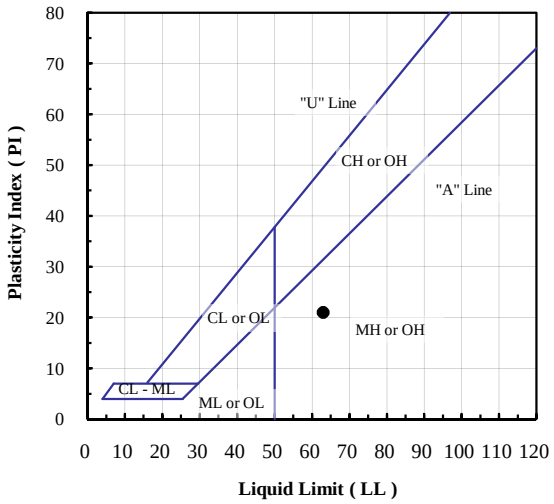
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2 "	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	100.0
#10	2.00	99.9
#20	0.850	99.3
#40	0.425	98.4
#60	0.250	96.9
#100	0.150	95.0
#200	0.075	92.8

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	
Sand (%):	7.2
Fines (%):	92.8
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B-6-2	11B319E	71.6	92.8	63	42	21	MH - Elastic silt

Note(s):

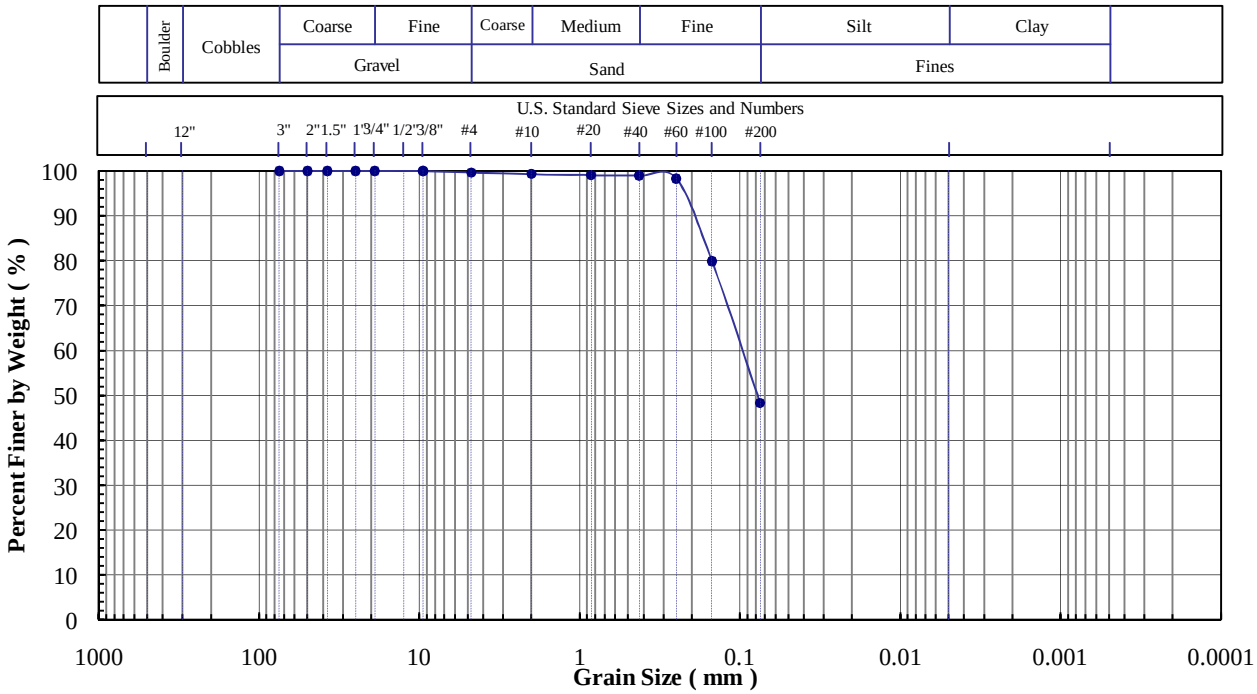
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
941 Forrest Street, Roswell, Georgia 30075
Tel: (770) 650 1666 Fax: (770) 650 5786

Project Name:	Ascon IRM Geotechnical Investigation
Project No:	475
Client Sample ID:	B-6-9
Lab Sample No:	11B320E

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



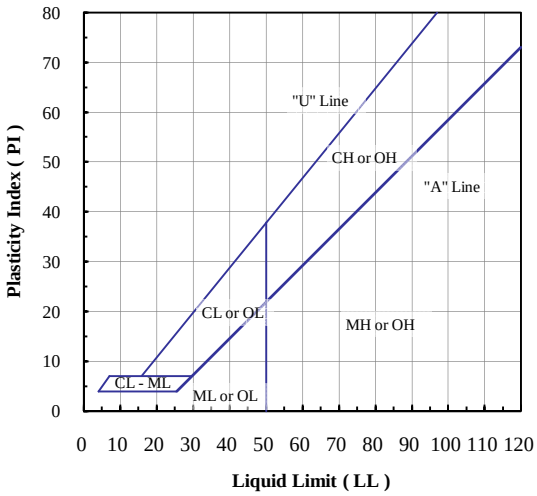
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2 "	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	99.7
#10	2.00	99.3
#20	0.850	99.1
#40	0.425	99.0
#60	0.250	98.3
#100	0.150	79.9
#200	0.075	48.3

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	0.3
Sand (%):	51.4
Fines (%):	48.3
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B-6-9	11B320E	24.8	48.3				

Note(s):

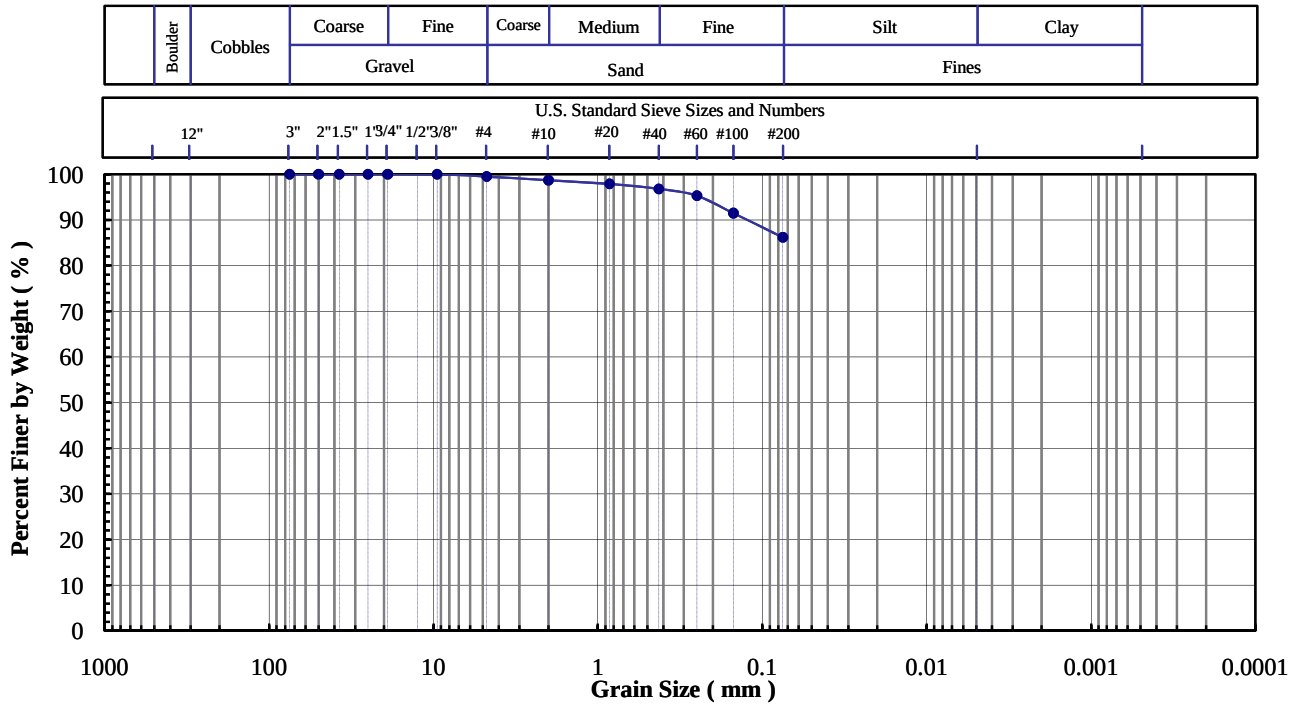
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
941 Forrest Street, Roswell, Georgia 30075
Tel: (770) 650 1666 Fax: (770) 650 5786

Project Name: Ascon IRM Geotech. Investigation
Project No: 475
Client Sample ID: B-3-3
Lab Sample No: B322E

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



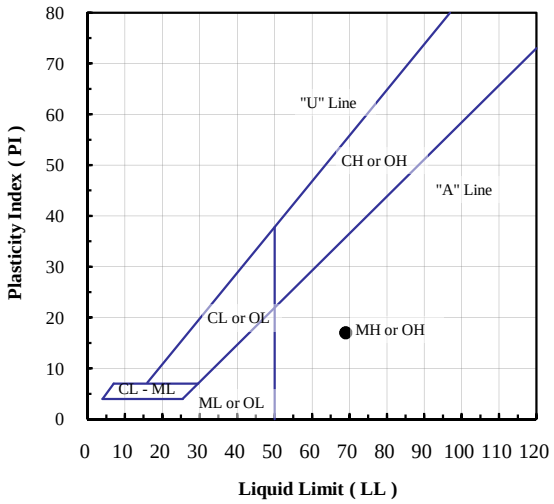
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2 "	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	99.5
#10	2.00	98.7
#20	0.850	97.9
#40	0.425	96.8
#60	0.250	95.3
#100	0.150	91.5
#200	0.075	86.2

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	0.5
Sand (%):	13.3
Fines (%):	86.2
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B-3-3	B322E		86.2	69	52	17	MH - Elastic silt

Note(s):

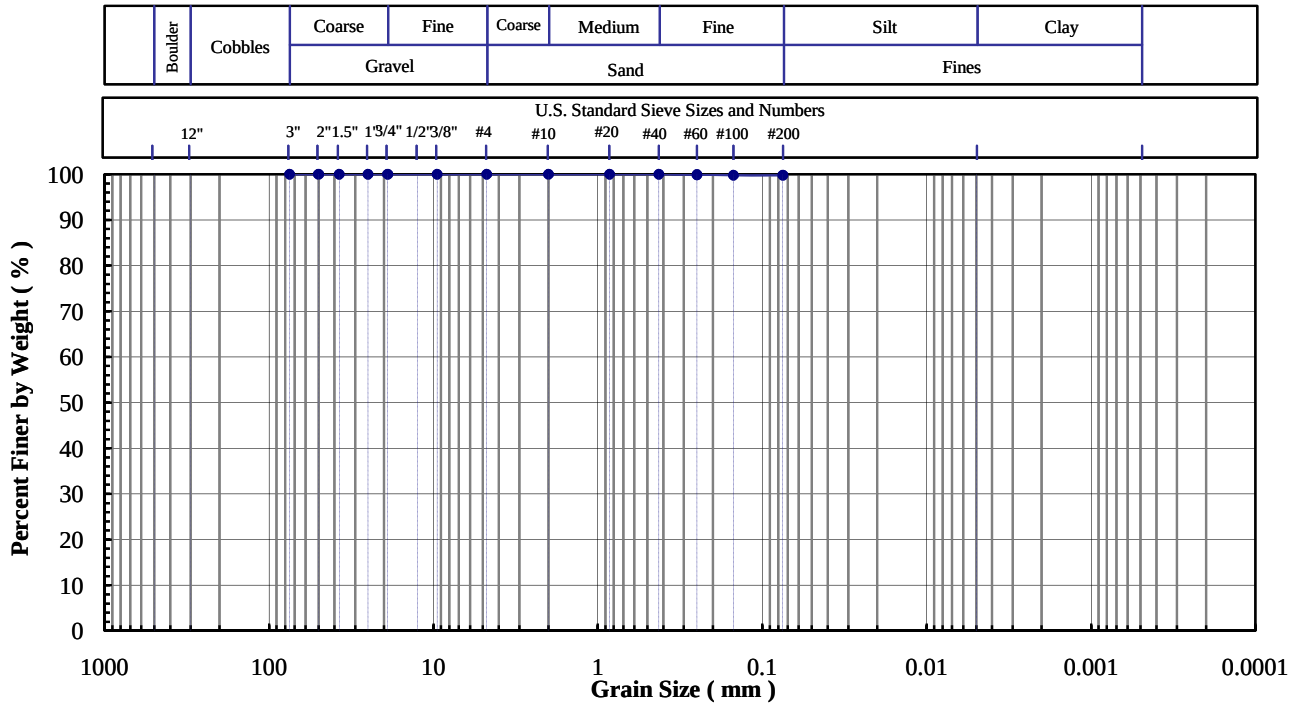
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
941 Forrest Street, Roswell, Georgia 30075
Tel: (770) 650 1666 Fax: (770) 650 5786

Project Name: Ascon IRM Geotech. Investigation
Project No: 475
Client Sample ID: B-4-2
Lab Sample No: B323E

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



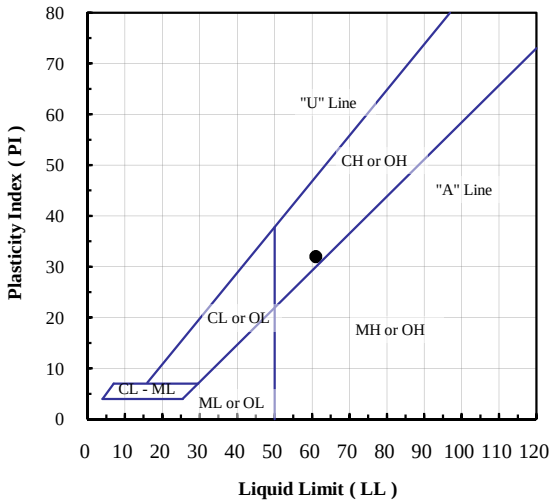
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2 "	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	100.0
#10	2.00	100.0
#20	0.850	100.0
#40	0.425	100.0
#60	0.250	99.9
#100	0.150	99.8
#200	0.075	99.8

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	
Sand (%):	0.2
Fines (%):	99.8
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B-4-2	B323E		99.8	61	29	32	CH - Fat clay

Note(s):

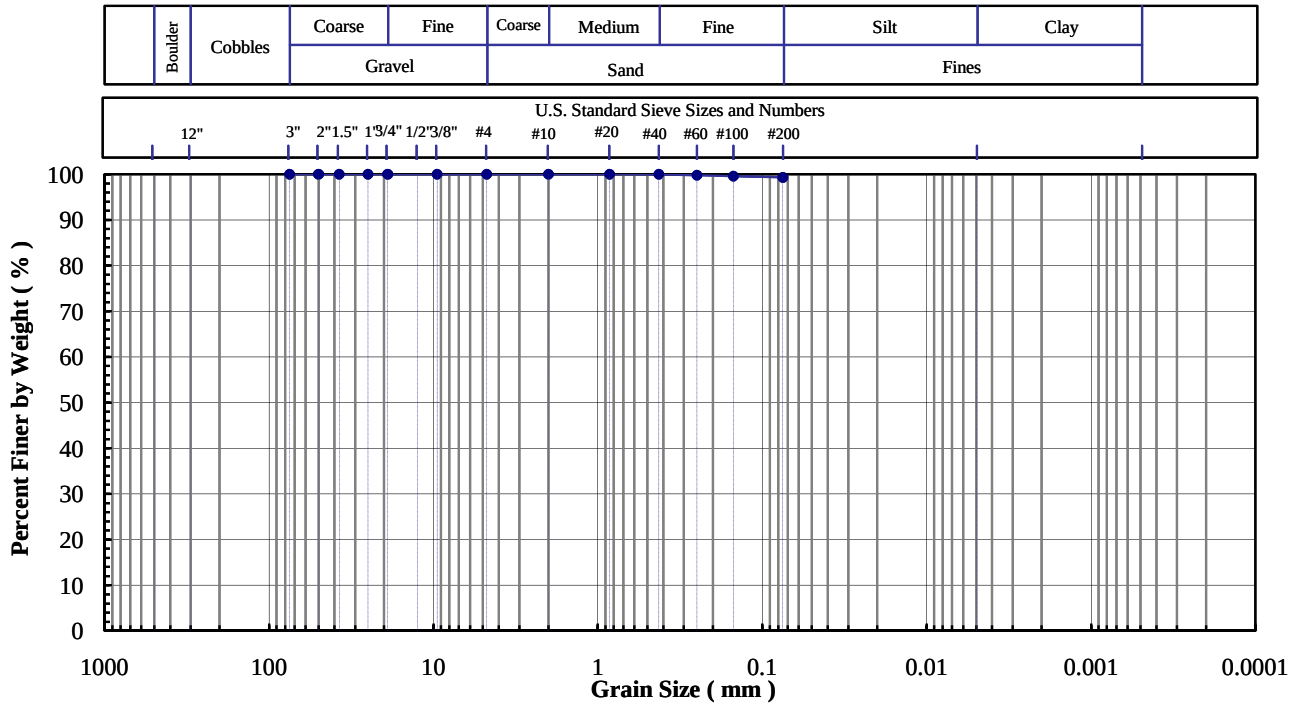
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
941 Forrest Street, Roswell, Georgia 30075
Tel: (770) 650 1666 Fax: (770) 650 5786

Project Name:	Ascon IRM Geotech. Investigation
Project No:	475
Client Sample ID:	B-6-4
Lab Sample No:	B324E

ASTM C 136, D 422, D 854, D 1140, D2216, D 2487, D4318

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



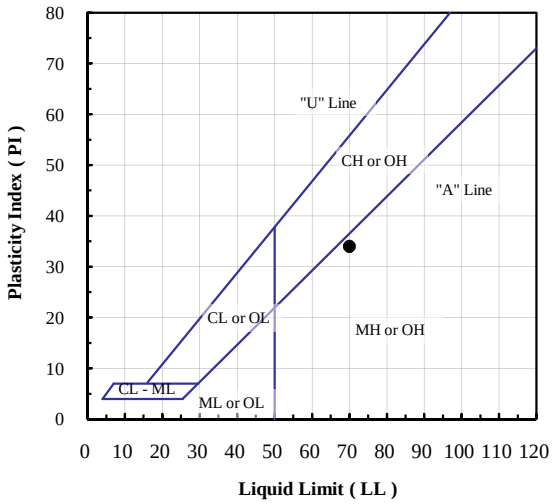
Sieve No.	Size (mm)	% Finer
3"	75	100.0
2 "	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	100.0
#10	2.00	100.0
#20	0.850	100.0
#40	0.425	100.0
#60	0.250	99.8
#100	0.150	99.6
#200	0.075	99.3

Specific Gravity (-):	

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	
Sand (%):	0.7
Fines (%):	99.3
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B-6-4	B324E		99.3	70	36	34	MH - Elastic silt

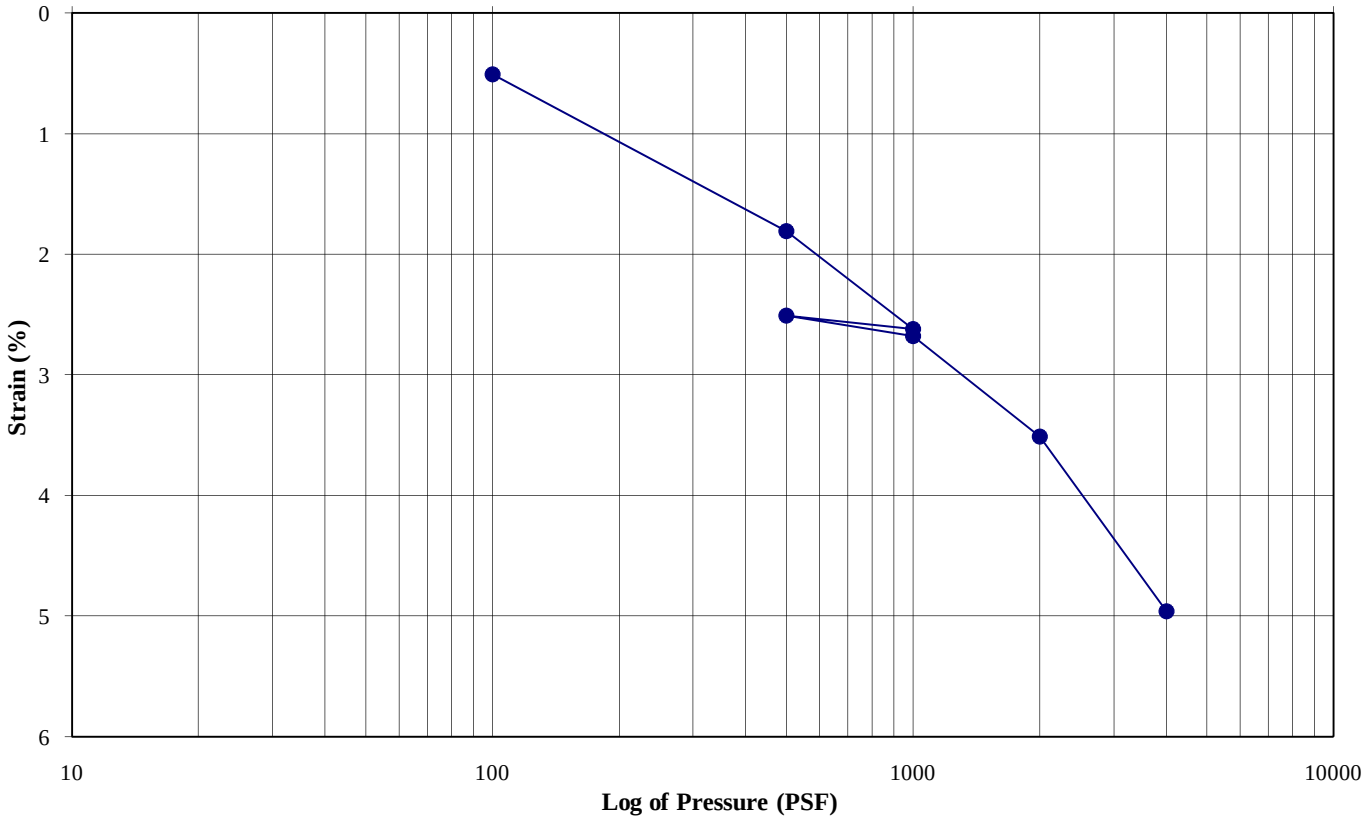
Note(s):

Excel Geotechnical Testing, Inc
"Excellence in Testing"
941 Forrest Street, Roswell, Georgia 30075
Tel: (770) 650 1666 Fax: (770) 650 5786

Project Name: Ascon IRM Geotech. Investigation
Project No: 475
Client Sample ID: B-2-2
Lab Sample No: 11B321E

ASTM D 2435

ONE-DIMENSIONAL CONSOLIDATION TEST



Client Sample ID	Lab Sample No.	Specimen Quality 1-10 (Bad to Good)	Test Specimen Initial Conditions				Consolidation Pressure (psf)	Pressure Increment Duration (min)	Accumu.(1) Vertical Strain (%)	Figure No.	Remarks
			Height (cm)	Diameter (cm)	Dry Unit Weight (pcf)	Moisture Content (%)					
B-2-2	11B321E	6	2.54	6.35	86.7	27.9	100	64	0.51	1	
							500	125	1.81	2	
							1000	1146	2.62	3	
							500	245	2.51	4	
							1000	517	2.68	5	
							2000	240	3.51	6	
							4000	1252	4.96	7	

Note(s):

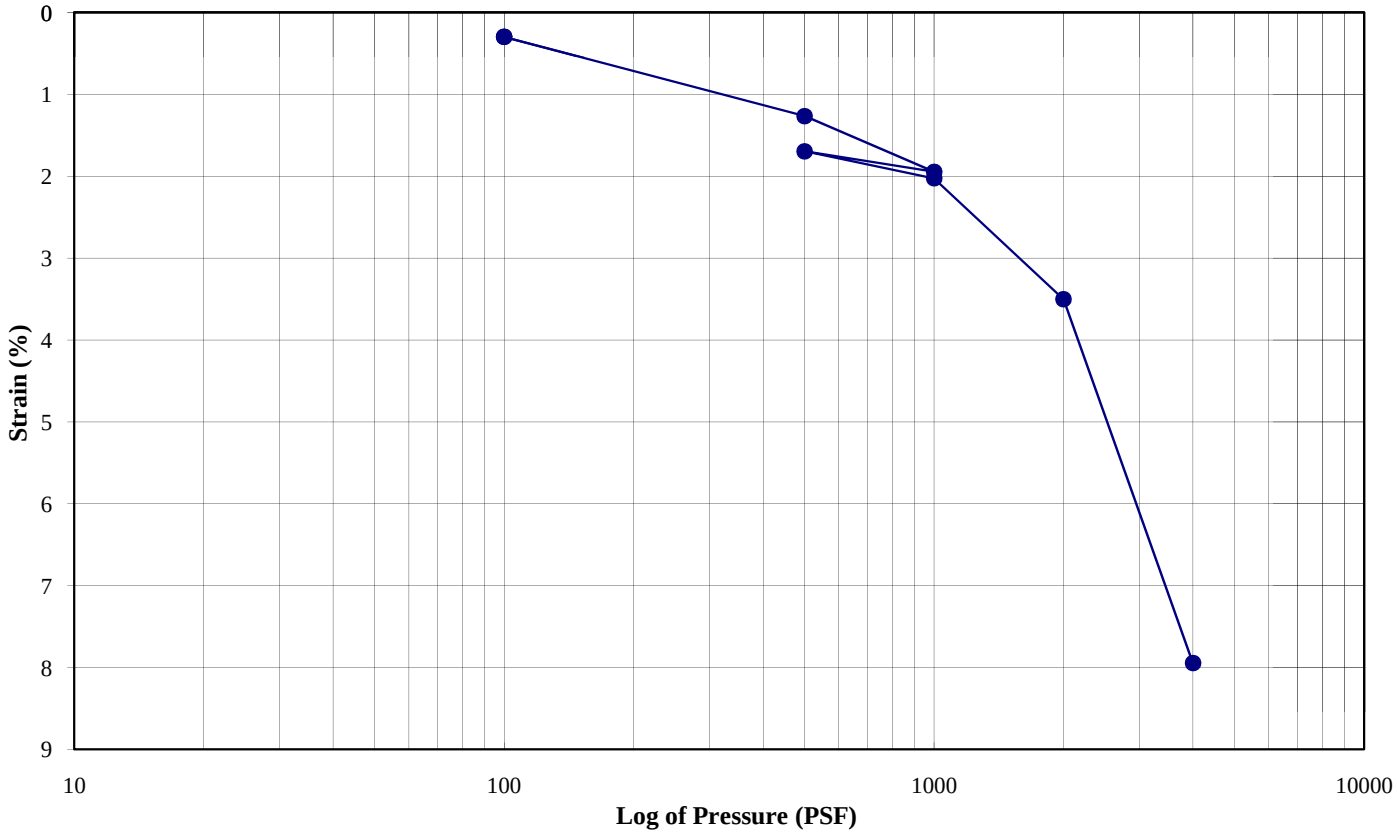
1. For each pressure increment, the vertical strain values were calculated based on the final deformation measurements.

Excel Geotechnical Testing, Inc
"Excellence in Testing"
941 Forrest Street, Roswell, Georgia 30075
Tel: (770) 650 1666 Fax: (770) 650 5786

Project Name: Ascon IRM Geotech. Investigation
Project No: 475
Client Sample ID: B-3-3
Lab Sample No: 11B322E

ASTM D 2435

ONE-DIMENSIONAL CONSOLIDATION TEST



Client Sample ID	Lab Sample No.	Specimen Quality 1-10 (Bad to Good)	Test Specimen Initial Conditions				Consolidation Pressure (psf)	Pressure Increment Duration (min)	Accumu.[1] Vertical Strain (%)	Figure No.	Remarks
			Height (cm)	Diameter (cm)	Dry Unit Weight (pcf)	Moisture Content (%)					
B-3-3	11B322E	7	2.54	6.35	58.1	64.5	100	64	0.30	1	
							500	1400	1.27	2	
							1000	1425	1.95	3	
							500	1415	1.70	4	
							1000	1457	2.03	5	
							2000	1376	3.50	6	
							4000	1529	7.95	7	

Note(s):

1. For each pressure increment, the vertical strain values were calculated based on the final deformation measurements.

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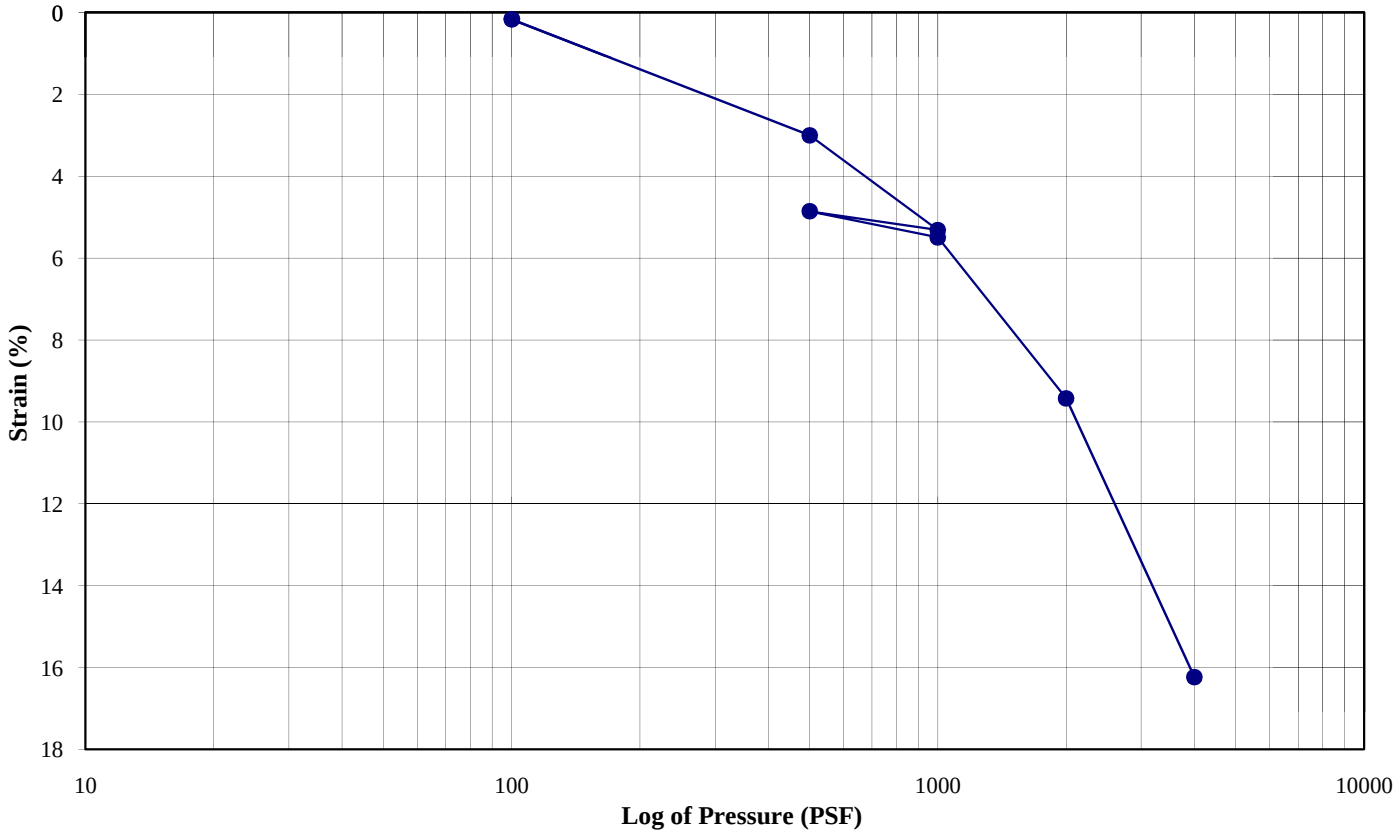
Tel: (770) 650 1666 Fax: (770) 650 5786

Project Name: Ascon IRM Geotech. Investigation
Project No: 475
Client Sample ID: B-4-2
Lab Sample No: 11B323E

ASTM D 2435

ONE-DIMENSIONAL CONSOLIDATION TEST



Client Sample ID	Lab Sample No.	Specimen Quality 1-10 (Bad to Good)	Test Specimen Initial Conditions				Consolidation Pressure (psf)	Pressure Increment Duration (min)	Accumu.[1] Vertical Strain (%)	Figure No.	Remarks
			Height (cm)	Diameter (cm)	Dry Unit Weight (pcf)	Moisture Content (%)					
B-4-2	11B323E	6	2.54	6.35	55.5	71.7	100	34	0.17	1	
							500	1390	3.00	2	
							1000	1449	5.32	3	
							500	1564	4.86	4	
							1000	1367	5.50	5	
							2000	1446	9.43	6	
							4000	3885	16.24	7	

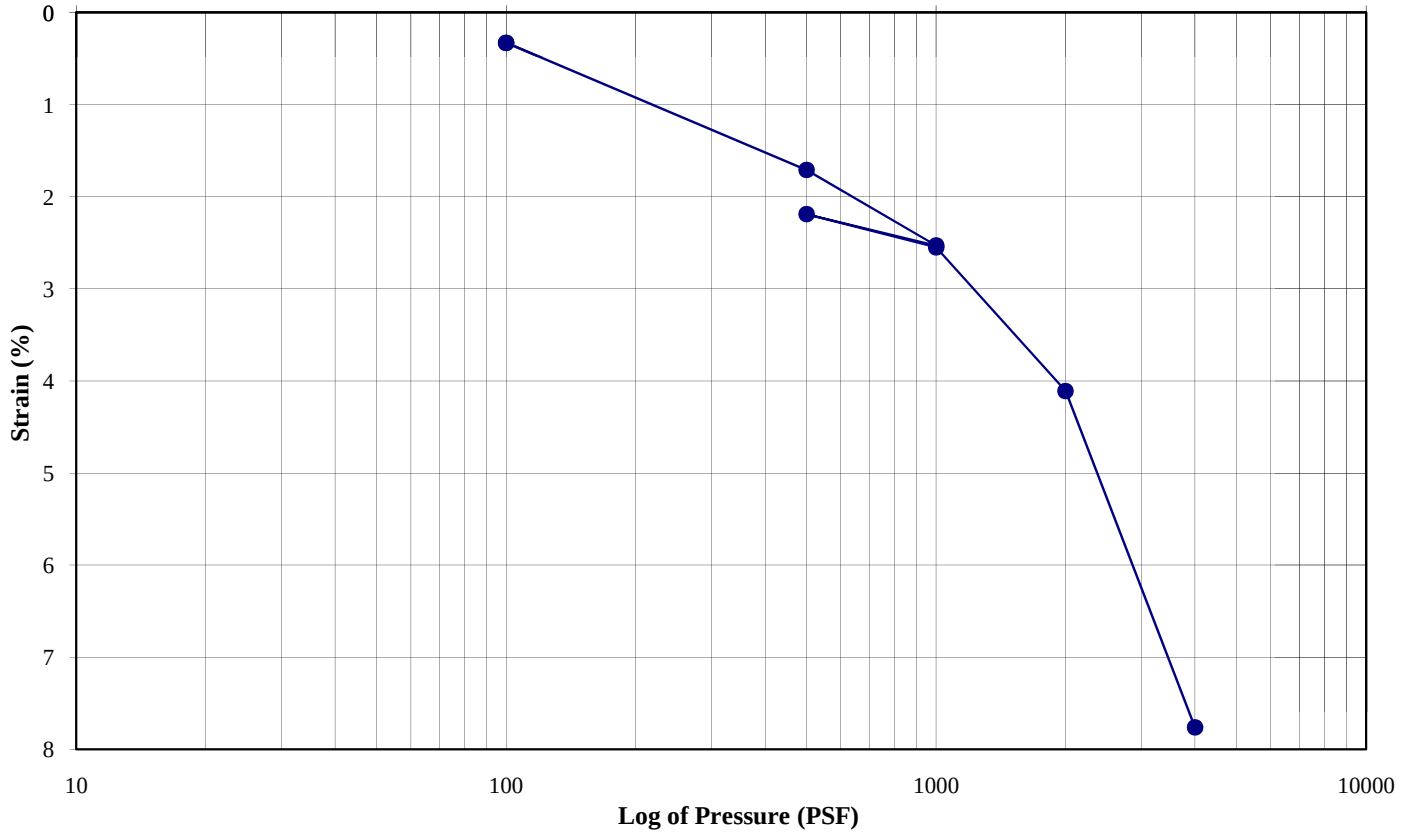
Note(s):
1. For each pressure increment, the vertical strain values were calculated based on the final deformation measurements.

Excel Geotechnical Testing, Inc
"Excellence in Testing"
941 Forrest Street, Roswell, Georgia 30075
Tel: (770) 650 1666 Fax: (770) 650 5786

Project Name: Ascon IRM Geotech. Investigation
Project No: 475
Client Sample ID: B-6-4
Lab Sample No: 11B324E

ASTM D 2435

ONE-DIMENSIONAL CONSOLIDATION TEST



Client Sample ID	Lab Sample No.	Specimen Quality 1-10 (Bad to Good)	Test Specimen Initial Conditions				Consolidation Pressure (psf)	Pressure Increment Duration (min)	Accumu.[1] Vertical Strain (%)	Figure No.	Remarks
			Height (cm)	Diameter (cm)	Dry Unit Weight (pcf)	Moisture Content (%)					
B-6-4	11B324E	7	2.54	6.35	71.2	47.4	100	19	0.33	1	
							500	1307	1.71	2	
							1000	180	2.53	3	
							500	1056	2.19	4	
							1000	240	2.55	5	
							2000	1200	4.11	6	
							4000	1653	7.76	7	

Note(s):

1. For each pressure increment, the vertical strain values were calculated based on the final deformation measurements.

Excel Geotechnical Testing, Inc.

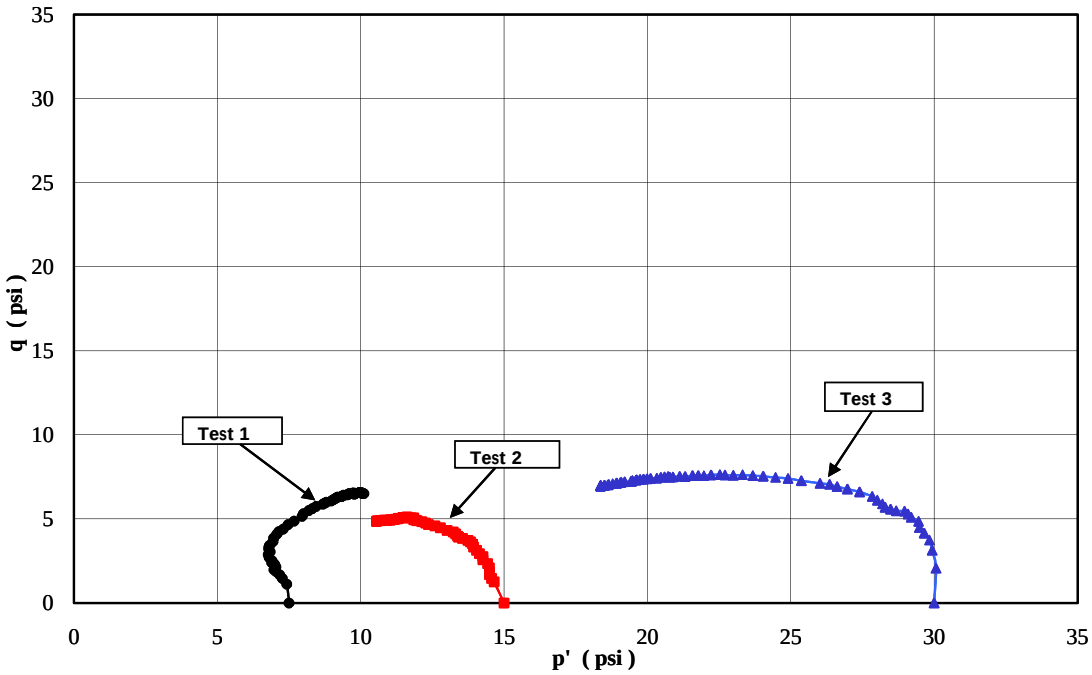
941 Forrest Street, Roswell, Georgia 30075

Project Name:	Ascon IRN Geotech. Investigation
Project No:	475
Site Sample ID:	B-3-3
Lab Sample No:	11B322E

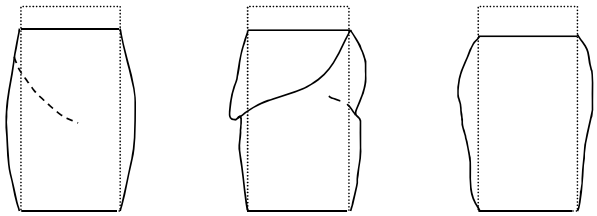
ASTM D 4767

CONSOLIDATED-UNDRAINED (CU) TRIAXIAL TEST WITH PORE PRESSURE MEASUREMENTS

Figure 2



Test Specimen No.	Initial Conditions							Strain Rate	Specimen Quality Bad to Good
	Height (in .)	Diameter (in.)	Moisture Content (%)	Dry Unit Weight (pcf)	B Parameter (-)	u_i (psi)	σ'_c (psi)	(% / min)	(1 to 10)
1	6.17	2.84	47.2	75.3	0.99	60.0	7.5	0.049	8
2	6.13	2.80	65.9	61.7	0.98	60.0	15.0	0.049	6
3	6.15	2.80	59.5	66.2	0.97	60.0	30.0	0.049	6



Specimen No.1 Specimen No. 2 Specimen No. 3

Notes:

u_i = Initial pore pressure,(psi)

σ'_c= Consolidation pressure, (psi)

Excel Geotechnical Testing, Inc.
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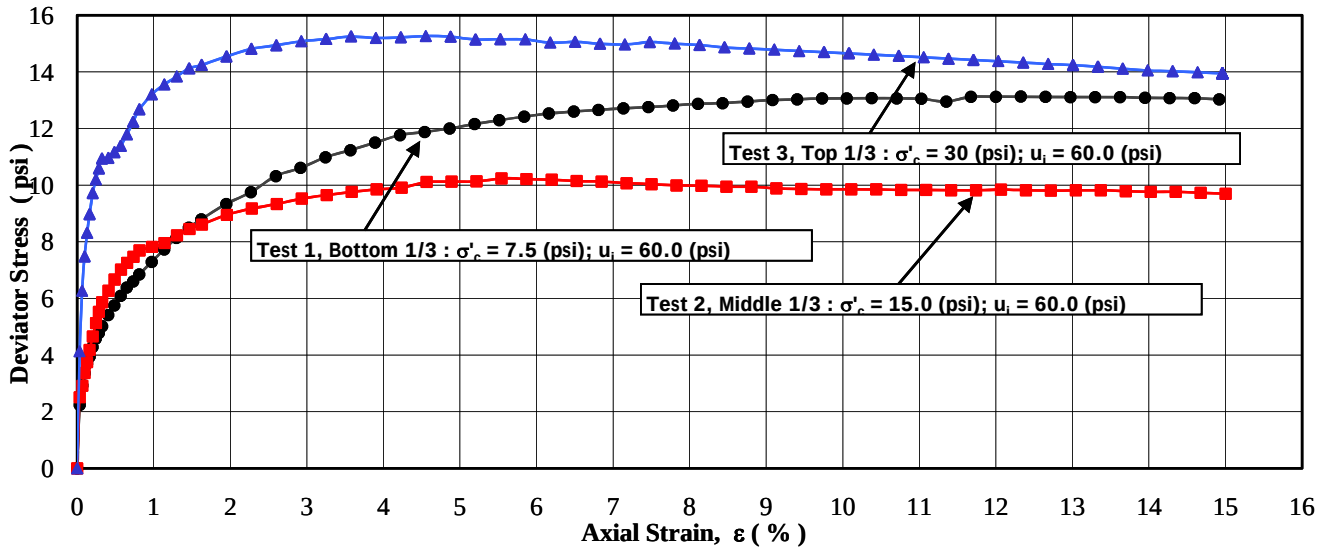
941 Forrest Street, Roswell, Georgia 30075
Tel: (770) 650 1666 Fax: (770) 650 5786

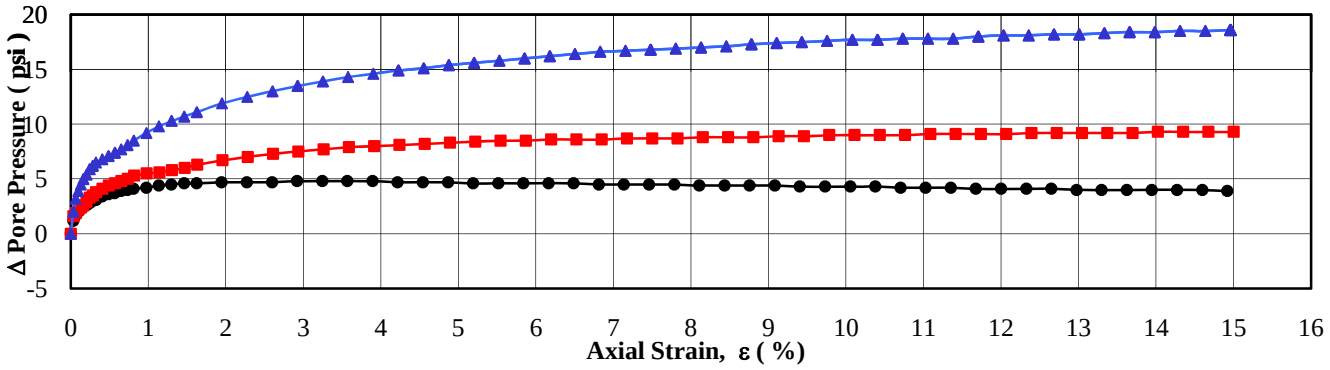
Project Name:	Ascon IRN Geotech. Investigation
Project No:	475
Site Sample ID:	B-3-3
Lab Sample No:	11B322E

ASTM D 4767

CONSOLIDATED-UNDRAINED (CU) TRIAXIAL TEST WITH PORE PRESSURE MEASUREMENTS

Figure 1





Test Specimen No.	Maximum Strength				
	$\sigma'_1 - \sigma'_3$ (psi)	σ'_1 (psi)	σ'_3 (psi)	u (psi)	ε_a (%)
1	13.0	16.6	3.6	63.9	14.9
2	10.2	16.7	6.5	68.5	5.5
3	15.3	30.2	14.9	75.1	4.6

Test Specimen No.	Strength at App. 15% Axial Strain				
	$\sigma'_1 - \sigma'_3$ (psi)	σ'_1 (psi)	σ'_3 (psi)	u (psi)	ε_a (%)
1	13.0	16.6	3.6	63.9	14.9
2	9.7	15.4	5.7	69.3	15.0
3	13.9	25.3	11.4	78.6	15.0

Notes:

σ'_c = Consolidation pressure, (psi)
σ'_1 = Effective axial stress, (psi)
u = Pore pressure,(psi)
u_i = Initial pore pressure,(psi)
σ'_3 = Effective radial stress (confining pressure), (psi)
ε_a = Axial strain, (%)
$\sigma'_1 - \sigma'_3$ = Deviator stress, (psi)

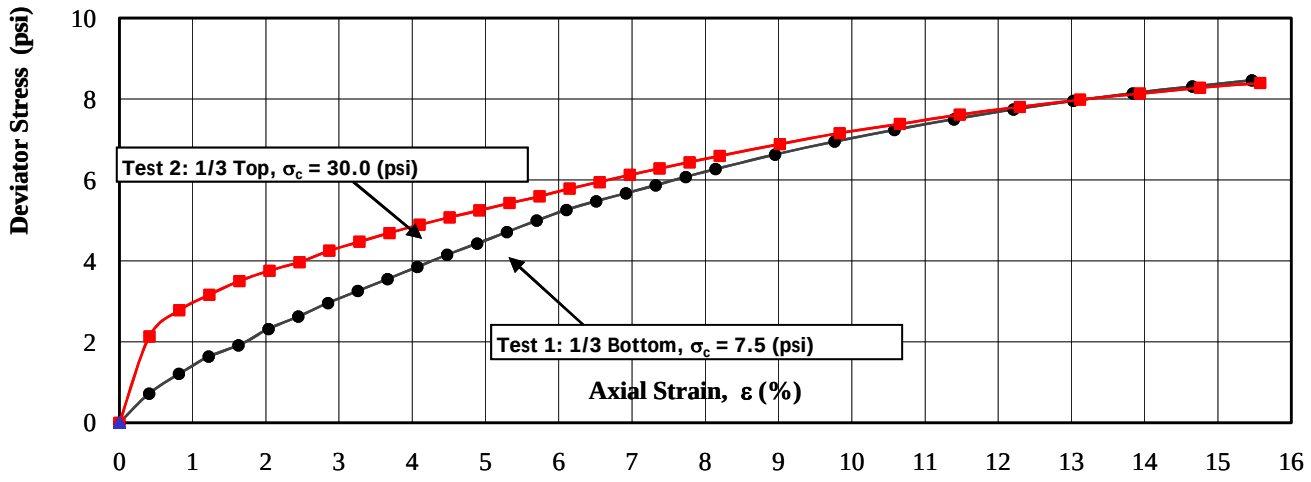
Excel Geotechnical Testing, Inc.
"Excellence in Testing"

941 Forrest Street, Roswell, Georgia 30075

Project Name:	Ascon IRM Geotech. Investigation
Project No:	475
Sample ID:	B-4-2
Lab Sample No:	11B323E

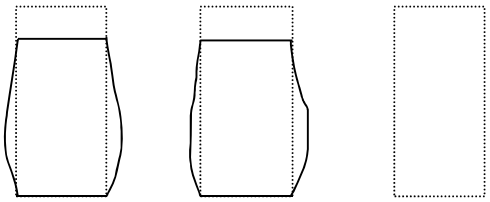
ASTM D 2850

UNCONSOLIDATED-UNDRAINED (UU) TRIAXIAL TEST



Test Specimen No.	Initial Conditions					Strain Rate
	Height (in)	Diameter (in)	Moisture Content (%)	Dry Unit Weight (pcf)	Specimen Quality (-)	(% / min)
1	6.14	2.74	45.5	76.3	5	0.977
2	6.10	2.87	54.5	68.7	8	0.984

Test Specimen No.	Maximum Strength			
	$\sigma_1 - \sigma_3$ (psi)	σ_1 (psi)	σ_3 (psi)	ε_a (%)
1	8.5	16.0	7.5	15.5
2	8.4	38.4	30.0	15.6



Specimen No.1 Specimen No. 2 Specimen No. 3

Test Specimen No.	Strength at App. 15% Axial Strain			
	$\sigma_1 - \sigma_3$ (psi)	σ_1 (psi)	σ_3 (psi)	ε_a (%)
1	8.5	16.0	7.5	15.5
2	8.4	38.4	30.0	15.6

Notes:

σ_c = Cell pressure, (psi)
σ_1 = Axial stress, (psi)
$\sigma_1 - \sigma_3$ = Deviator stress, (psi)
σ_3 = Radial stress (confining pressure), (psi)
ε_a = Axial strain, (%)

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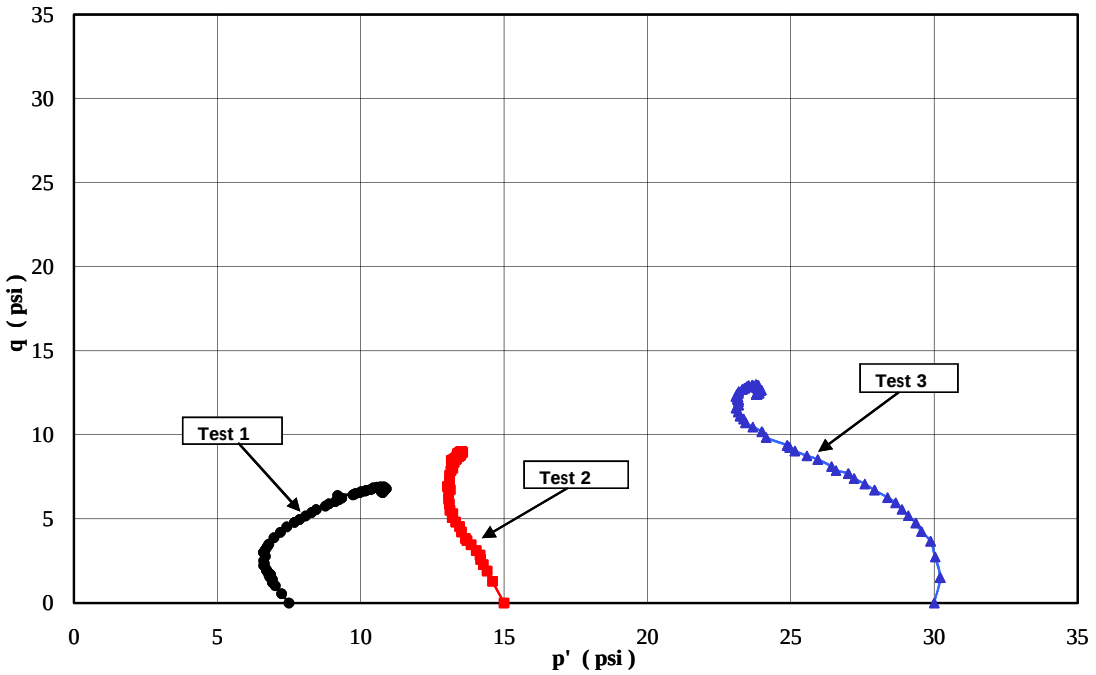
Project Name:	Ascon IRM Geotech. Investigation
Project No:	475
Site Sample ID:	B-6-4
Lab Sample No:	11B324E

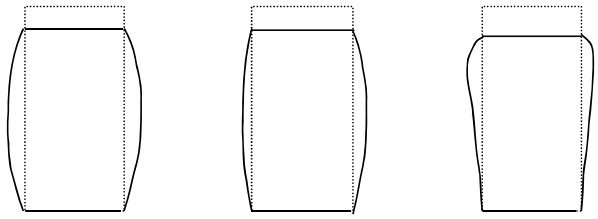
ASTM D 4767

CONSOLIDATED-UNDRAINED (CU) TRIAXIAL TEST WITH PORE PRESSURE MEASUREMENTS

Figure 2



Test Specimen No.	Initial Conditions							Strain Rate	Specimen Quality Bad to Good
	Height (in .)	Diameter (in.)	Moisture Content (%)	Dry Unit Weight (pcf)	B Parameter (-)	u_i (psi)	σ'_c (psi)	(% / min)	(1 to 10)
1	6.19	2.82	52.9	71.0	0.98	60.0	7.5	0.048	8
2	6.18	2.84	56.8	63.7	0.99	60.0	15.0	0.032	7
3	6.17	2.84	60.0	65.9	0.99	60.0	30.0	0.032	7



Specimen No.1 Specimen No. 2 Specimen No. 3

Notes:

u_i = Initial pore pressure,(psi)

σ'_c= Consolidation pressure, (psi)

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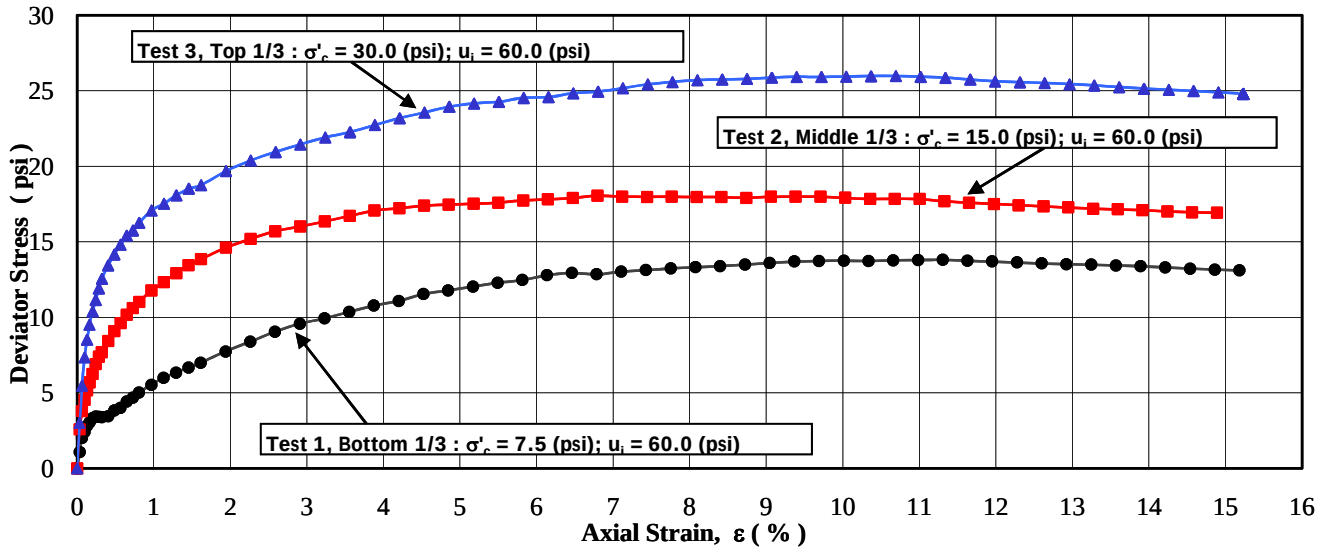
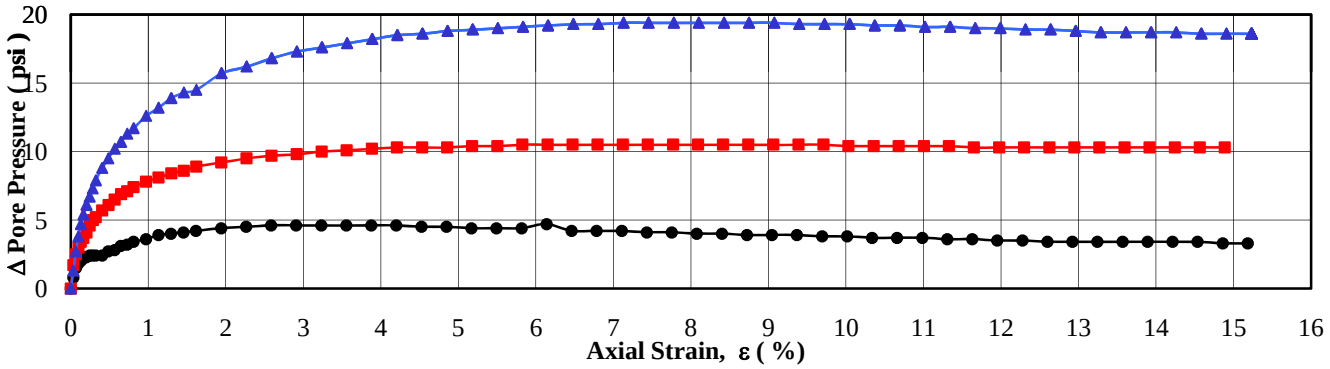
Project Name:	Ascon IRM Geotech. Investigation
Project No:	475
Site Sample ID:	B-6-4
Lab Sample No:	11B324E

ASTM D 4767

CONSOLIDATED-UNDRAINED (CU) TRIAXIAL TEST WITH PORE PRESSURE MEASUREMENTS

Figure 1





Test Specimen No.	Maximum Strength				
	$\sigma'_1 - \sigma'_3$ (psi)	σ'_1 (psi)	σ'_3 (psi)	u (psi)	ε_a (%)
1	13.1	17.3	4.2	63.3	15.2
2	16.9	21.6	4.7	70.3	14.9
3	24.8	36.2	11.4	78.6	15.2

Test Specimen No.	Strength at App. 15% Axial Strain				
	$\sigma'_1 - \sigma'_3$ (psi)	σ'_1 (psi)	σ'_3 (psi)	u (psi)	ε_a (%)
1	13.1	17.3	4.2	63.3	15.2
2	16.9	21.6	4.7	70.3	14.9
3	24.8	36.2	11.4	78.6	15.2

Notes:

σ'_c = Consolidation pressure, (psi)
σ'_1 = Effective axial stress, (psi)
u = Pore pressure,(psi)
u_i = Initial pore pressure,(psi)
σ'_3 = Effective radial stress (confining pressure), (psi)
ε_a = Axial strain, (%)
$\sigma'_1 - \sigma'_3$ = Deviator stress, (psi)

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FLEXIBLE WALL PERMEABILITY TEST [1]

ASTM D 5084 *

Project Name:	Ascon IRM Geotechnical Investigation
Project Number:	475
Client Name:	Geosyntec Consultants
Site Sample ID:	B-2-2
Lab Sample Number:	11B321E
Material Type:	NA
Specified Value (cm/sec):	NA
Date Test Started:	2/18/2011

Specimen	Test Specimen Initial Condition					Test Conditions					Hydraulic
No.	Spec. Prep. [2] (-)	Spec. Length (cm)	Spec. Diameter (cm)	Dry Unit Weight (pcf)	Moisture Content (%)	Cell Press. (psi)	Back Press. (psi)	Consolid. Press. (psi)	Permeant Liquid [3] (-)	Average Gradient (-)	Conductivity (cm/s)
1	ST	5.74	7.23	99.7	24.0	62.5	60.0	2.5	DTW	15	2.6E-6
						80.0		20.0		15	2.0E-7

Notes:

1. Method C, "Falling-Head, Increasing-Tailwater" test procedures were followed during the testing.
2. Specimen preparation: ST = Shelby Tube, R = Remolded, B = Block Sample.
3. Type of permeant liquid: DTW = Deaired Tap Water, DDI = Deaired Deionized Water

* Deviations:

Laboratory temperature at 22±3 °C.
Test specimen final conditions are not presented.

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FLEXIBLE WALL PERMEABILITY TEST [1]

ASTM D 5084 *

Project Name:	Ascon IRM Geotechnical Investigation
Project Number:	475
Client Name:	Geosyntec Consultants
Site Sample ID:	B-3-3
Lab Sample Number:	11B322E
Material Type:	NA
Specified Value (cm/sec):	NA
Date Test Started:	2/18/2011

Specimen	Test Specimen Initial Condition					Test Conditions					Hydraulic
No.	Spec. Prep. [2] (-)	Spec. Length (cm)	Spec. Diameter (cm)	Dry Unit Weight (pcf)	Moisture Content (%)	Cell Press. (psi)	Back Press. (psi)	Consolid. Press. (psi)	Permeant Liquid [3] (-)	Average Gradient (-)	Conductivity (cm/s)
1	ST	5.62	7.19	55.3	66.7	62.5	60.0	2.5	DTW	6	2.1E-5
						80.0		20.0		13	5.2E-7

Notes:

1. Method C, "Falling-Head, Increasing-Tailwater" test procedures were followed during the testing.
2. Specimen preparation: ST = Shelby Tube, R = Remolded, B = Block Sample.
3. Type of permeant liquid: DTW = Deaired Tap Water, DDI = Deaired Deionized Water

* Deviations:

Laboratory temperature at 22±3 °C.
Test specimen final conditions are not presented.

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FLEXIBLE WALL PERMEABILITY TEST [1]

ASTM D 5084 *

Project Name:	Ascon IRM Geotechnical Investigation
Project Number:	475
Client Name:	Geosyntec Consultants
Site Sample ID:	B-4-2
Lab Sample Number:	11B323E
Material Type:	NA
Specified Value (cm/sec):	NA
Date Test Started:	2/23/2011

Specimen	Test Specimen Initial Condition					Test Conditions					Hydraulic
No.	Spec. Prep. [2] (-)	Spec. Length (cm)	Spec. Diameter (cm)	Dry Unit Weight (pcf)	Moisture Content (%)	Cell Press. (psi)	Back Press. (psi)	Consolid. Press. (psi)	Permeant Liquid [3] (-)	Average Gradient (-)	Conductivity (cm/s)
1	ST	5.64	7.06	67.6	59.1	62.5	60.0	2.5	DTW	15	1.9E-7
						80.0		20.0		9	5.1E-8

Notes:

1. Method C, "Falling-Head, Increasing-Tailwater" test procedures were followed during the testing.
2. Specimen preparation: ST = Shelby Tube, R = Remolded, B = Block Sample.
3. Type of permeant liquid: DTW = Deaired Tap Water, DDI = Deaired Deionized Water

* Deviations:

Laboratory temperature at 22±3 °C.
Test specimen final conditions are not presented.

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FLEXIBLE WALL PERMEABILITY TEST [1]

ASTM D 5084 *

Project Name:	Ascon IRM Geotechnical Investigation
Project Number:	475
Client Name:	Geosyntec Consultants
Site Sample ID:	B-6-4
Lab Sample Number:	11B324E
Material Type:	NA
Specified Value (cm/sec):	NA
Date Test Started:	2/24/2011

Specimen	Test Specimen Initial Condition					Test Conditions					Hydraulic
No.	Spec. Prep. [2] (-)	Spec. Length (cm)	Spec. Diameter (cm)	Dry Unit Weight (pcf)	Moisture Content (%)	Cell Press. (psi)	Back Press. (psi)	Consolid. Press. (psi)	Permeant Liquid [3] (-)	Average Gradient (-)	Conductivity (cm/s)
1	ST	5.67	7.16	72.4	51.6	62.5	60.0	2.5	DTW	4	2.7E-6
						80.0		20.0		13	2.4E-7

Notes:

1. Method C, "Falling-Head, Increasing-Tailwater" test procedures were followed during the testing.
2. Specimen preparation: ST = Shelby Tube, R = Remolded, B = Block Sample.
3. Type of permeant liquid: DTW = Deaired Tap Water, DDI = Deaired Deionized Water

* Deviations:

Laboratory temperature at 22±3 °C.
Test specimen final conditions are not presented.

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Test Results Summary

Project Name: Ascon IRM Geotech. Investigation

Project No.: 475

Sample Information		Test Information								
Site ID	Lab No.	Moisture Content ASTM D 2216	Fines Content ASTM D 1140	Dry Unit Weight(1) Weight Modified ASTM D 2937		Attreberg Limits ASTM D 4318			Engineering Classification ASTM D 2487	Remarks
				Density	Moisture	LL	PL	PI		
(-)	(-)	(%)	(%)	(pcf)	(%)	(-)	(-)	(-)	(-)	
B-2-2	11B321E			87.1	30.1					
B-3-3	11B322E			64.4	55.9					
B-4-2	11B323E			69.6	50.9					
B-6-4	11B324E			66.8	50.7					

Notes:

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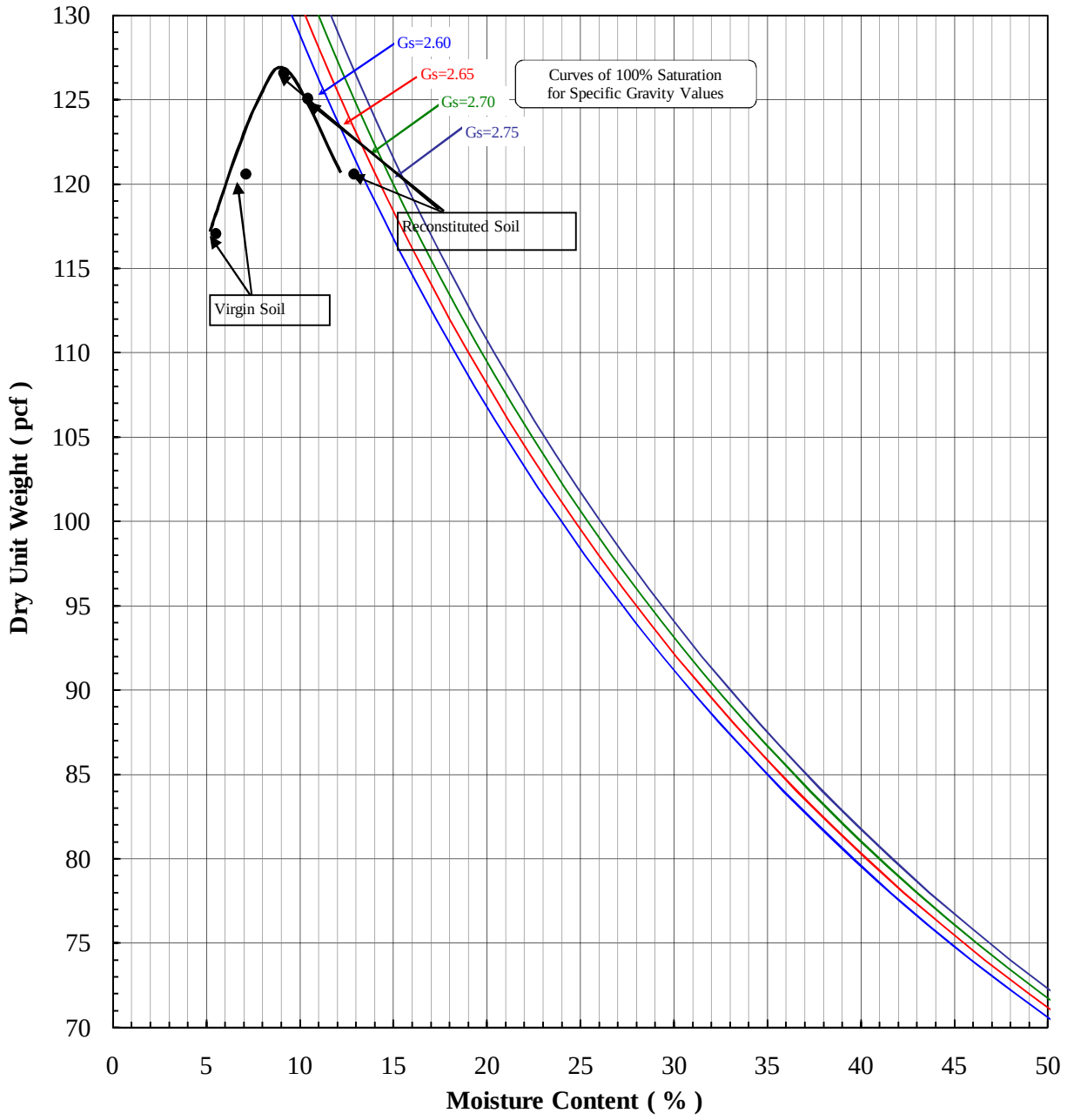
Project Name:	Ascon IRM Geotech. Investigation
Project No:	475
Client Sample ID:	B-1-1
Lab Sample No:	11B306E

ASTM D 1557 **COMPACTION MOISTURE-DENSITY RELATIONSHIP** **Modified - Method B**



Client/Site Sample ID.	Lab Sample No:	Maximum Dry Unit Weight (pcf)	Optimum Moisture Content (%)	Remarks
B-1-1	11B306E	128.1	9.3	

Note(s):

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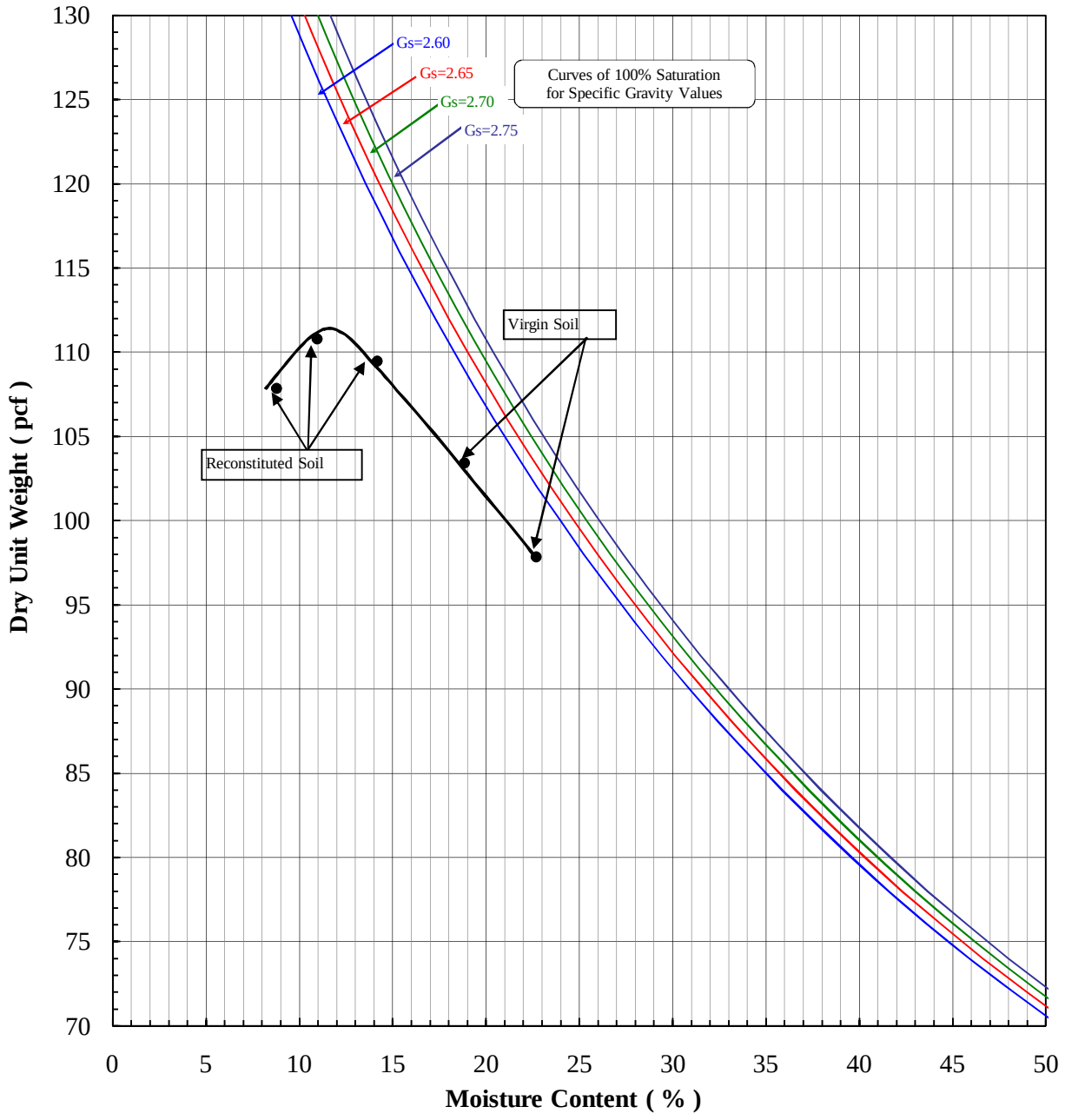
Project Name:	Ascon IRM Geotech. Investigation
Project No:	475
Client Sample ID:	B-2-1
Lab Sample No:	11B309E

ASTM D 1557 **COMPACTION MOISTURE-DENSITY RELATIONSHIP** **Modified - Method B**



Client/Site Sample ID.	Lab Sample No:	Maximum Dry Unit Weight (pcf)	Optimum Moisture Content (%)	Remarks
B-2-1	11B309E	111.4	12.0	

Note(s):

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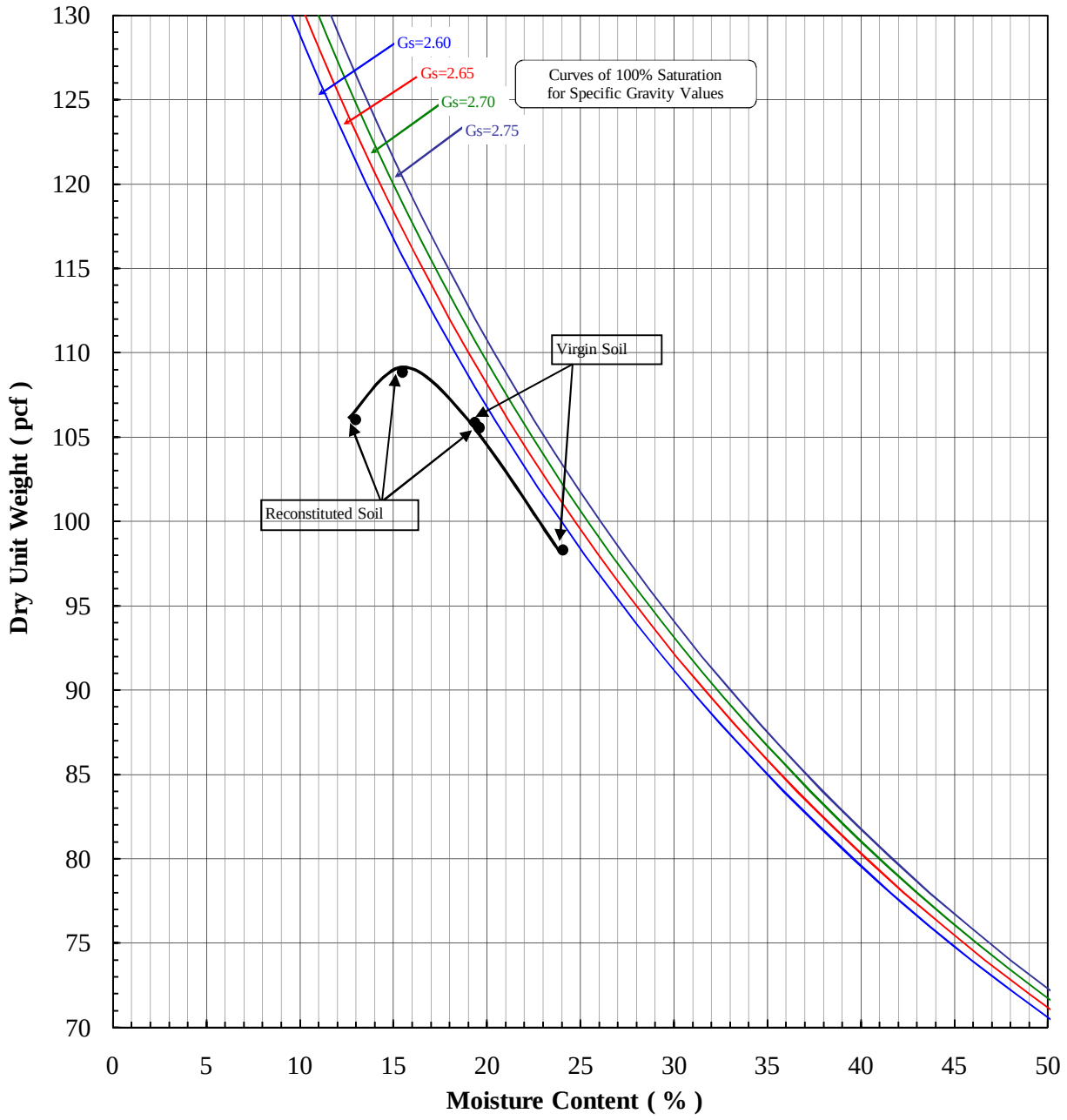
Project Name:	Ascon IRM Geotech. Investigation
Project No:	475
Client Sample ID:	B-3-1
Lab Sample No:	11B312E

ASTM D 1557 **COMPACTION MOISTURE-DENSITY RELATIONSHIP** **Modified - Method B**



Client/Site Sample ID.	Lab Sample No:	Maximum Dry Unit Weight (pcf)	Optimum Moisture Content (%)	Remarks
B-3-1	11B312E	109.2	15.9	

Note(s):